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Go-ahead for call monitoring system

By Lauraine Sayers

MELBOURNE — A national telephone monitoring system, comprising Australian software and Danish hardware, finally looks set to get the go-ahead from Telecom after two years of negotiations.

Although it was still awaiting official approval at the time of going to press, industry sources claim that the $A2.9 million contract with LM Ericsson Pty Ltd is the first such order to be signed in Australia, and one of the first to be placed in the world.

As such, it is expected to generate vast export potential for the Australian software being developed by Melbourne-based DEC OEM, Praxa Pty Ltd.

The call charge analysis system (CCAS) is to be used to monitor the accuracy of customer phone bills, now being performed by a "cumbersome" old system renowned for its lack of proper support.

Adapted

CCAS comprises Microvax computers and Smart-10 terminals, which were manufactured and adapted for Australian conditions by Danish company, GN Elmi AS, and are distributed locally by Ericsson.

"The terminals will be connected to relevant telephone exchange lines by engineers to sort through and monitor electrical pulses on that line," said Peter Dewildt, Praxa system developer.

"Using billing algorithms held on a central Microvax, in conjunction with its own intelligence, it can then calculate a detailed customer's statement based on what phone numbers are dialled, and the duration of each call.

"That information is logged back on to the Microvax, and a discrepancy report is printed, which can be used to check the accuracy of the normal Telecom bill generated over the same amount of time.

"One Microvax will support a

(Continued page 2)

Red tape hobbles $A8m packet net

By Luis Huesch

MELBOURNE — The Melbourne Metropolitan Board of Works has begun linking its computing and communication resources in a private packet-switching network claimed to be one of the world's most advanced X.25 installations.

But the ambitions of its network designers to get the most for their money in flexibility, security, cost-efficiency and, above all, full data/voice integration, may have to wait for further liberalisation of Telecom regulations.

The board has bought $A8 million worth of packet-switching gear from Datacraft, will shortly call tenders for 2M-bit/sec microwave link equipment, and is evaluating tenders for "a pile of PABXs", according to Ron Zammit, manager, data networks.

He said the board's initial intention was to tie together all of its 38 mainframes and minis, and thousands of terminals, as well as some 15 PABXs in one fully integrated network. But no decision had yet been taken pending an evaluation of the microwave tenders and the options open under present Telecom rules.

Ron Zammit . . . seeking the best way to tie it all together.

The first stage of the two-stage networking project, due for completion by the end of this month, uses a hybrid approach for linking the board's head office to its new computer centre at Mitcham and to a main depot at Mt Waverley.

It uses a Telecom 2M-bit/sec leased line from head office to the computer centre, but a microwave link is used to connect the Mt Waverley site. This was because it would have cost $A100,000 to get leased line service — "always a problem with Telecom's radial network," according to Zammit.

He said preliminary network evaluations had shown microwave to be cheaper over five years, but initially Telecom might have to be used.

Zammit did not elaborate on the policy issues involved, but observers noted that he described the private network as a "value-added network" (Van) because of

(Continued page 3)

The world according to Gartner gurus

By Luis Huesch

SYDNEY — Communications will take the largest slice of the corporate budget, equipment options will triple in the next three years, SNA will become "like OSI" — and the WC will be the most important spot in the company.

This last prediction is only superficially facetious: the wiring closet (WC) on the departmental floor will house the corporation's strategic information backbone. The "distributed" fourth-generation PABX will sit there, with remote switching units connected by optical fibre vertical trunks. It will be part of the office network, doubling as a time-division multiplexer to switch high-speed Lan circuits.

According to industry analyses and forecasts during two days of briefings here late last month, voice and data will remain separated at the desktop. They will travel in a one-sheath, split-wiring formation (dual twisted pair) to the WC where integration and/or distribution will occur.

Two experts from the US Gartner Group, Dale Kutnick and Richard Imershein, and Adrian Wood and Jennifer Adelstein from Sydney-based Compass Research, also offered these assessments of the communications industry:

- The PABX market share will shrink, it will be no real competitor to local area networking, and in five years PABX and Lan will be synonymous (see above).
- Unshielded twisted pair will be the preferred medium for both voice and data transmission — it will provide 80 per cent of all PC users with applications for the next five years. Shielded twisted pair will be reserved for hostile (that is, noisy) conditions.
- Optical fibre, initially used as vertical trunks between WCs on each floor, will become cheap enough by 1991 to compete with twisted pair.
- Ethernet baseband coax will wither and die, and broadband coax (such as Sytek) will find a preserve in specialised applications.
- Departmental Lans will be connected by gateways throughout the company and to the outside world. Here Lans benefit also from the higher-level network management software that PABXs do not support.
- Systems vendors will dominate the Lan market, and the main independent Lan makers such as Novell, Ungermann-Bass and 3Com will be pushed into the role of system integrators tying together equipment from numerous vendors.
- Token-passing will be the Lan standard.
- ISDN will make 64K-bit/sec and 2M-bit/sec "standards" for networking.

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'Distributed' switch is tipped as office hub

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■ "Bandwidth managers" incorporating TDMs, drop-insert muxes, packet-switching and Dacs functionality will control highspeed trunks by 1989 — at least in the US.

■ Network management standard may take up to 15 years to develop. Meanwhile IBM will use its Netview — now seen as more of a direction than a product — for "account control": users will be warned of "compatibility glitches" if they "contaminate" their network with non-IBM products and implicitly threatened that there will be no software support on non-IBM gear.

According to the forecasters, MIS will take control of both data AND voice by 1991, with a little bit of help from its friends at IBM: Big Blue's Netview enables MIS to collect statistics from PABXs now, and eventually also to process them. It will be able to manage Lans, Megalinks and PABXs in an integrated manner — all under MIS control. Accordingly, MIS/DP professionals will shift to general management status by 1988 and be expected to perform as asset managers.

Lans are the fastest-growing sector of the market with a 33 per cent compound annual growth rate but low-end Lans — particularly those that do not conform to a networking architecture such as SNA or DECnet — may fall victim to ISDN replacement of the lower levels of networking standards.

A similar fate is in store for modems and multiplexers (concerned vendors please turn to page 5 for a suggested way out of the impasse).

In the Lan versus Wan (wide-area network) contest, which can also be expressed as the Netbios v APPC/LU6.2 from the upper end of the Lan market. At present Netbios and Novell's Netware are standard in most organisations, but by the late 1980s IBM's Advanced Peer-to-Peer Communications (APPC) protocol will become increasingly important to large users extending their network architecture.

Meanwhile, Netbios and Netware will migrate toward OSI standards and retain the bulk of the lower end of the market, with bridges becoming available to APCC. However, OSI standards are not expected to be completed before 1992.

IBM is believed to have indentified OSI as a business opportunity and is expected to change SNA to look like OSI and to support OSI for inter-company communications. But it is tipped to maintain its SNA stranglehold on intra-company communications. SNA's lowest three layers (Transport) support ISDN X.25, Netbios, Ethernet and "almost everything" now; Open Systems Network Support (OSNS) covers layers four and five; and in the Application and Presentation layers SNA supports videotex, public switched data networks and CCITT access standards.

In the telecommunications area, users are warned to beware of "bait and switch" tactics by Telecom for ISDN: once organisations have committed to ISDN-capable equipment and software, it may face exorbitant charges for the network overhead.

On packet-switching networks, too, users are cautioned that they are paying for the overheads of software protocol — provided at either end of what are often "muddy" channels — whether they use it or not.

X.25 is also slated as inefficient, and incapable of dealing with the high-bandwidth inter-city traffic demands.

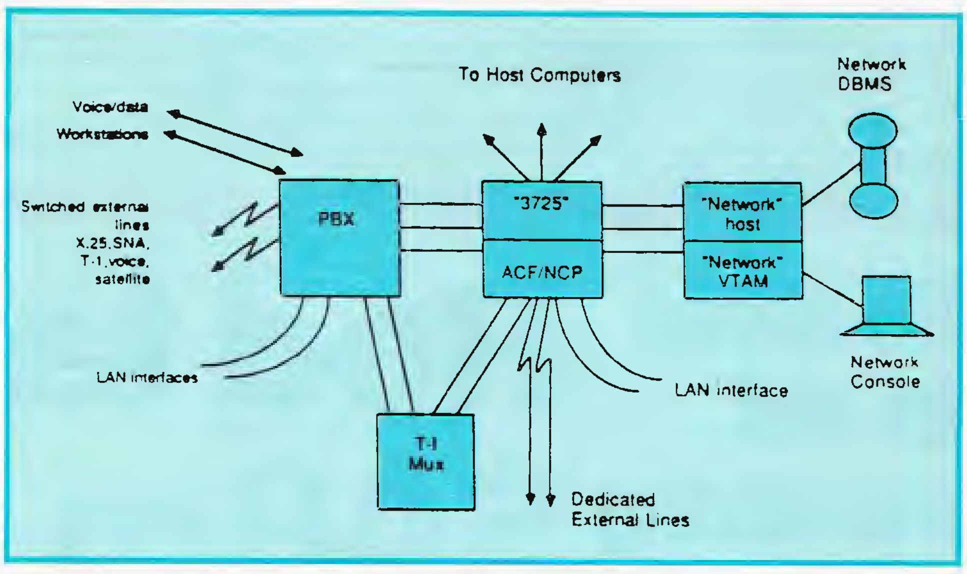
Micro-mainframe links, once the preferred user strategy for connecting workstations, are losing out fast to a three-tiered approach: central DP tied to a departmental processor linked to PCs at the department or workgroup level.

Projections by the Gartner/Compass analysts see the preferences almost exactly reversed by 1990 compared with 1986, with the split being 44-47 per cent today in favor of direct mainframe links versus 40-23 per cent in favor of three-tier connectivity in 1990.

The cluster controller/file server alternative, now estimated in place at 5 per cent of all sites, will also grow to a respectable 22 per cent. This augurs well for the makers of mid-range connectivity boxes.

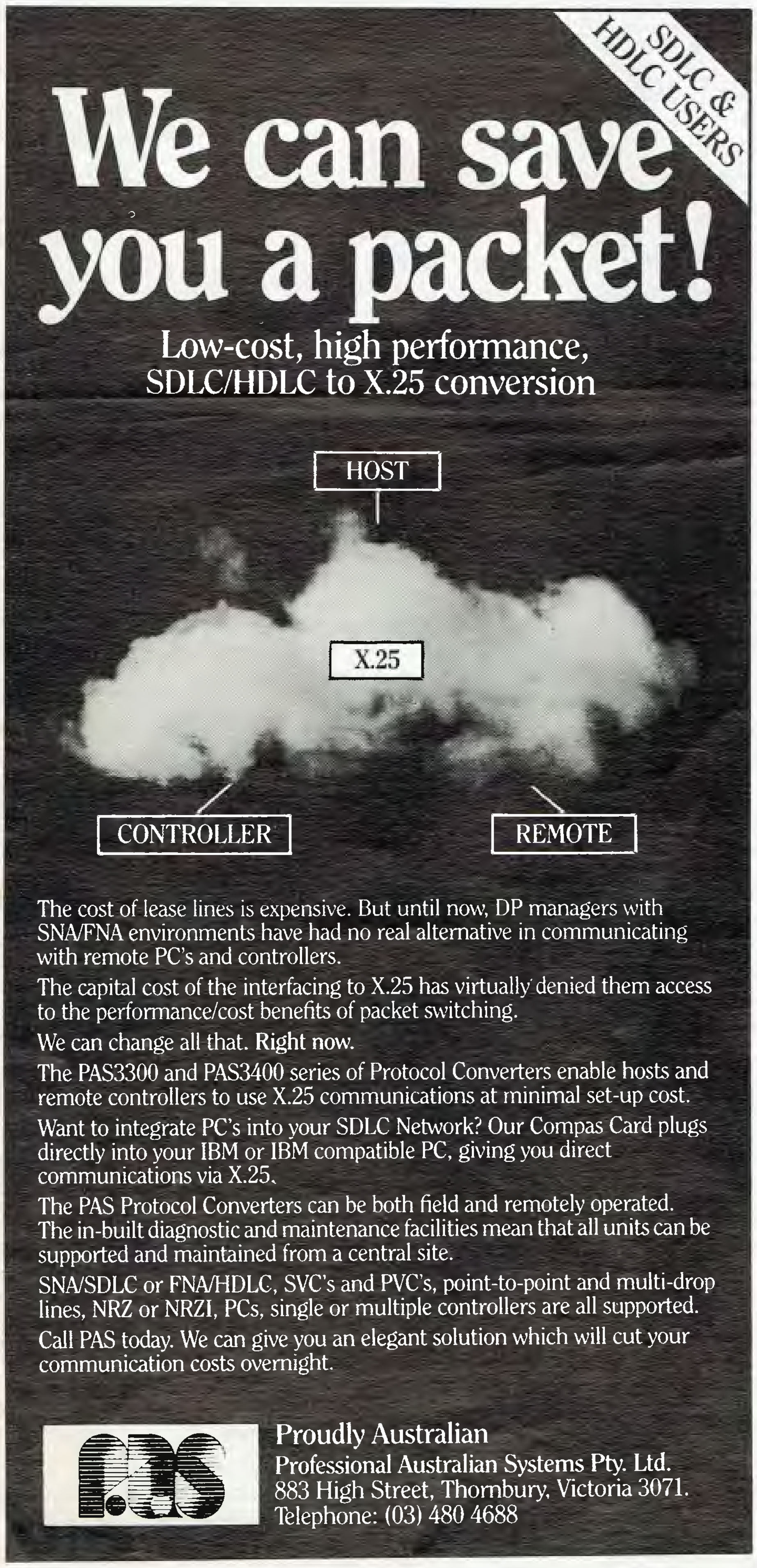
The growing use of work group PCs and department-level processors, once more, is tipped to widen and strengthen the role of the MIS professional, seen to evolve into the corporate information officer or CIO. He or she will have to define the direction and speed of changes; identify the key and strategic technologies; deal with the vital control issues in acquisition, applications development; and support and select vendors on the basis of existing and future technology options and support for emerging standards.

Because of this strategic role together with their increasing importance in the acquisition and interconnection process, MIS/CIO professionals will increasingly report to the managing director on board. The more tactical professionals, DP, OA telecommunications, networking and so on, will in turn report to the CIO.



IBM will tightly couple PABXs and front end processors in future, according to the Gartner Group. There will be a new 3725 with massively increased bandwidth, and the network host will be a 4381 or above dedicated to network management.

Diagram courtesy Gartner Group/Compass Research.


SDLC & HDLC USERS
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CONTROLLER
REMOTE

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Go-ahead

(Continued from page 1)

set of exchanges and there will be one Smart-10 terminal at each loal exchange."

The software is expected to take two man-years to write over six months. The complicated bit is knowing how much phone calls cost over what distances, Dewildt said. "For example an 069 area has different charging rates to other country areas, and they all vary depending on the time of day" He said the system was unique compared to other Smart-10 sites installed throughout the world.

The Praxa component of the contract is worth almost $A750,000 and is said to be the result of a long-term relationship that Praxa has built up with Ericsson over the past three years.

Antarctic to get upgrade

KINGSTON, Tas — Australia is upgrading the communications capability of its Davis research station in the Antarctic with a PABX and satellite link to Tasmania.

A Philips DLS110S, chosen by the Department of Science's Antarctic Division because it allows call charging to be linked to research staff identity numbers, has been shipped to Davis, where it will provide 50 extensions with a tie line to the division's Philips D1200 in Kingston.

Communications engineer Peter Magill, of the Department of Science, said that because the winter "shift" of 22 people at Davis rises to 50 or 60 in the Antarctic summer "we have allowed for expansion of the tie line facility if traffic demand requires".

PABX: Siemens opts out

MELBOURNE — Switch maker Siemens, hit hard by the dollar devaluation, has left the PABX market in Australia, scrapping production of its low-end units and letting Telecom look after its mid-range 601.

The company has signed an exclusive distributorship deal with Telecom for the third-generation 601 switches, under which it will have to increase local content to 60 per cent. Under its offsets obligations, it would have had to increase local content to 30 per cent by next February.

A Siemens spokesman said the company had been hit hard by the devaluation of the dollar about half a year ago, and had decided to abandon production of the small systems 30 and 80. It had contracted with Telecom to supply the 601 switch.

But the spokesman denied claims that Siemens had disbanded its PABX marketing force, saying it had retained customer engineers and intended to keep its presence in all States. A former Siemens PABX salesman said the company's entire NSW operation had been scrapped.

A Telecom spokesman said Telecom had acquired "a couple" of 601s already. He could not give any marketing forecast for the Siemens units.

Industry observers said the deal with Siemens was similar to Telecom's ill-fated tie-up with Philips years ago for selling the Harris 2020 switches: a public corporation trying to market a "failed product". Siemens, although doing well internationally, particularly with exchange switches, was thought to have less than two per cent of the Australian PABX market.

These sources said NEC had been approached about an exclusive distributorship but had declined.

The Siemens 601 handles from 200 to 800 extensions.

Six Iterra stations are nearly ready

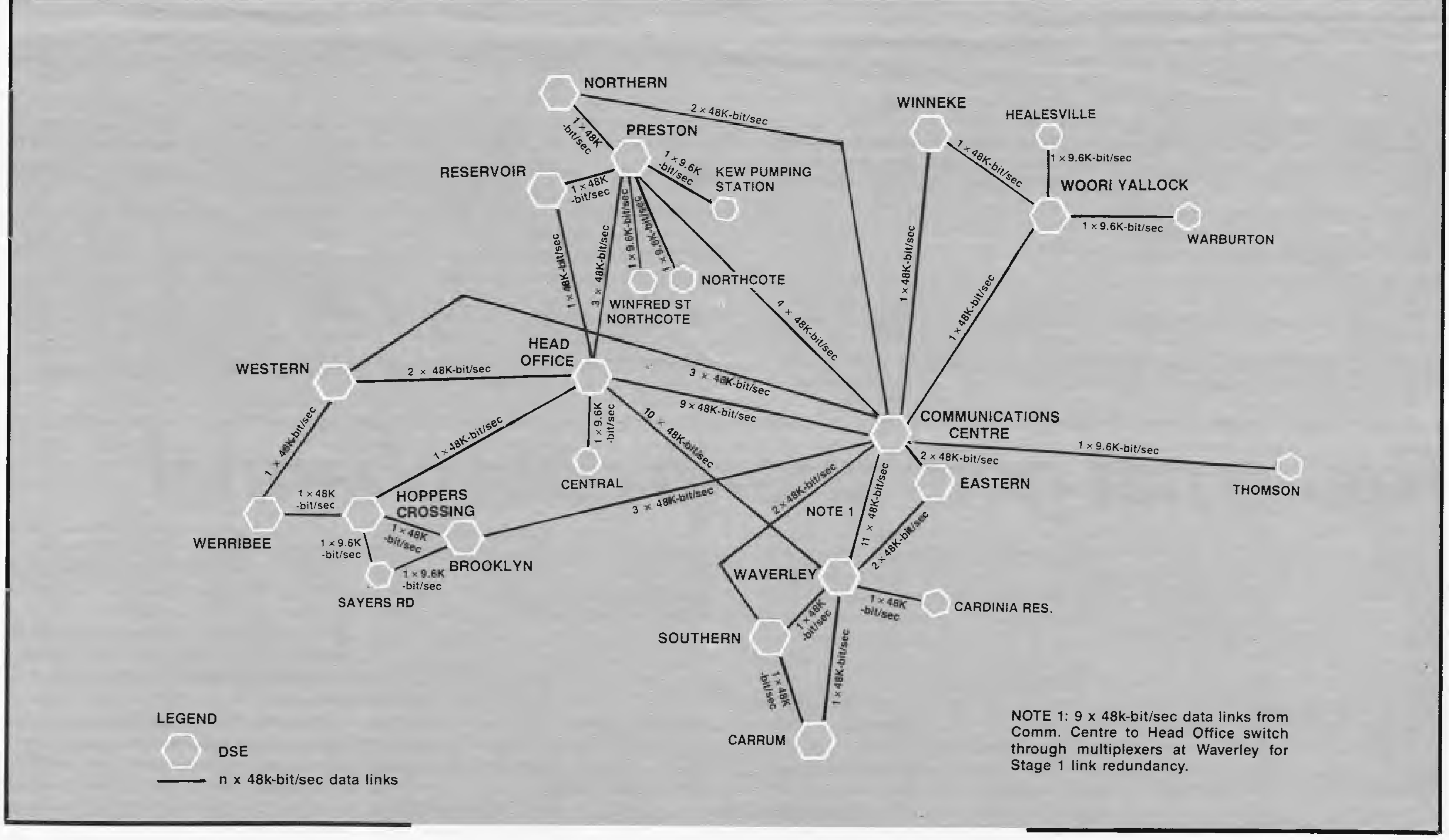
SYDNEY — Telecom is pushing ahead strongly with its Iterra Business Service, and has almost finished installation of six major earthstations around Australia.

Iterra marketing manager Cliff McAlpine told an Aussat conference here recently that physical installation of the 11m diameter antennas at Sydney's Mascot exchange, in Melbourne, Brisbane, Adelaide, Perth and Katherine was substantially complete. Only the RF (radio frequency) equipment was still being installed and tested.

Telecom expected to commission the stations by the end of the year, he said.

The service will use 2M-bit/sec bearers between stations from which a variety of other services will be derived, ranging from voice to 2M-bit broadband capacity down to 9.6k-bit/sec data services, "or less if you mux down from there".

An earth station was put at Katherine "mainly to save Telecom some dollars": it is outside the monsoon rain belt and outside the cyclonic belt and could therefore be smaller and less rugged than the one at Darwin, to which it was linked by optic fibre link, said McAlphine.



MMBW PACKET NETWORK-LOGICAL NETWORK LINKS

NOTE 1: 9 x 48k-bit/sec data links from Comm. Centre to Head Office switch through multiplexers at Waverley for Stage 1 link redundancy.

(Continued from page 1)

the protocol conversion provided by Datacraft's Telematics X.25 equipment. At the recent Aussat conference in Sydney an expert claimed that as far as the Department of Communications was concerned even the mere scrambling of a signal — as in the B-Mac encoding of TV transmission — elevated the system to value-added status and privileges.

Zammit said the Telematics X.25 equipment consisting of US hardware and UK software, was unusual in that it provided integral protocol conversion. This was important to the board because the terminals hanging off its Fujitsu Facom M360s and "Vaxes of all sizes" were asynchronous terminals.

In the first stage of the network development, consisting initially of three nodes and 800 to 900 terminals, the computers are being moved from head office to a "more secure" computer centre at Mitcham.

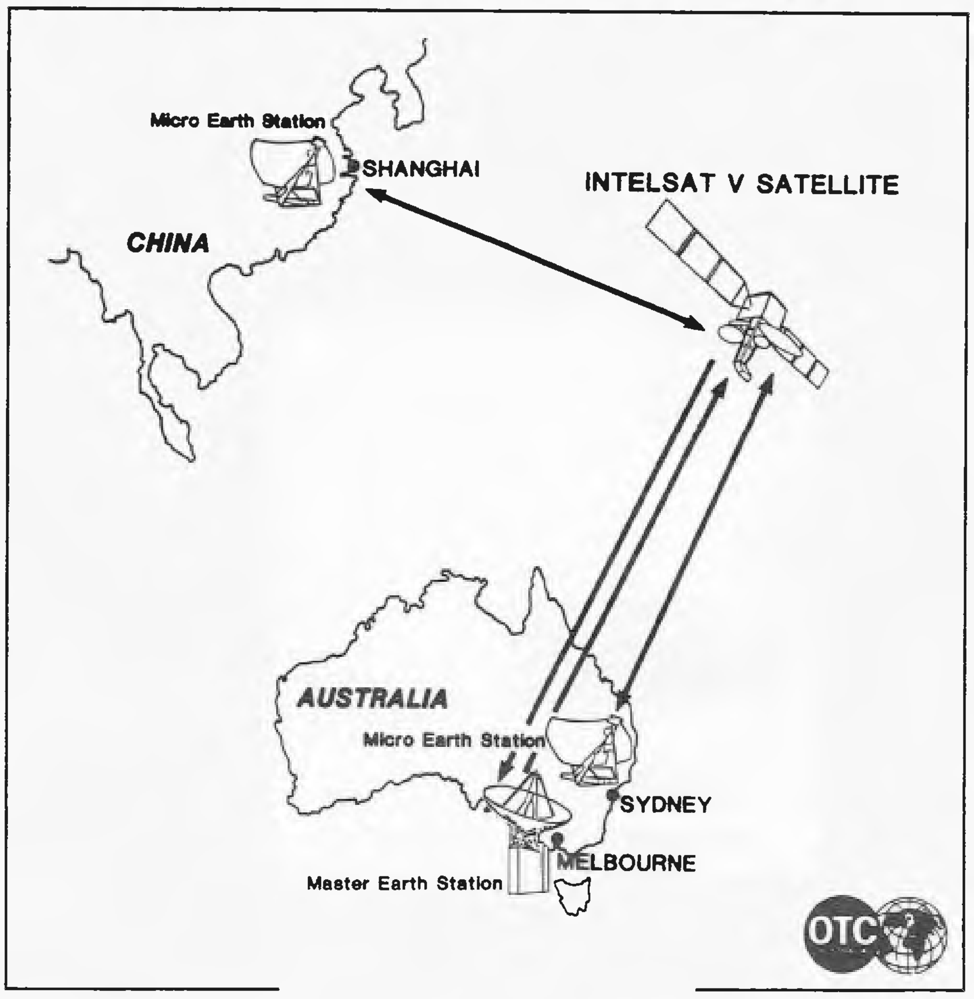
The second stage will comprise 20 nodes and be installed progressively until the end of next year, when the total terminal population is expected to reach 2500. The PABXs will be installed next year.

The computers on the network are used for a variety of tasks ranging from commercial and office automation work to engineering, real-time monitoring and control and computer-aided mapping.

The network is expected to reduce overall operating costs, provide flexibility and vendor independence and supply fast service for customers in the board's newly reorganised regional operations, according to acting general manager Neville Smith.

He said the network was the key to integrating the board's computing and communications, enabling all terminals to communicate with all computers in a corporation-wide data system.

OTC shows Chinese small-dish set-up



BEIJING — Chinese government delegates and potential commercial users attended a recent demonstration of the OTC's small-dish offering Satnet III which linked computer systems in Shanghai and Sydney.

The two-way linkup was part of a satellite communication seminar hosted by the Chinese Ministry of Posts and telecommunications.

Delegates from transport and electricity department, the Bank of China, Xinhua news agency, China Airlines and oil companies watched the demonstrations, using Equatorial Vsats linked via Intelsat and the OTC master earth station in Melbourne (see diagram).

According to OTC product manager, Stuart Howe, who demonstrated the facilities in China, "the Chinese business community is very interested in the latest communications technologies." It had therefore come as no surprise when the commission was invited to demonstrate its small-dish business service.

In Australia potential customers including Citibank, CRA and the ANZ Bank earlier this year trialled the service, which is part of the commission's planned digital data offerings using Intelsat transmission facilities.

Howe said the trials showed that Satnet III "has great potential for improving communications networks in government information management in mining and resources exploration, as well as in the financial, trade and travel sectors."

NZ users nervous of higher charges from Aussat link

By Stephen Bell

SYDNEY/WELLINGTON — New Zealand telecommunications users have welcomed Aussat's agreement to provide the New Zealand Post Office with domestic satellite communications capacity. But they fear the higher capacity link will lead to higher charges from the incoming telecommunications administration.

The five-year agreement between Aussat and the NZPO was signed in Sydney last month between Aussat managing director Graham Gosewinckel and NZPO assistant director-general Derek Rose.

The contract calls for a 30W transponder and part of a 12W transponder for point-to-multipoint communications capability to be provided via the third Aussat satellite, now scheduled for an Ariane launch next March.

The satellite will carry special antennas to give a footprint covering the South-West Pacific. Gosewinckel said discussions with the NZPO on the second-generation Aussat satellites — which would have an even greater capacity for communications in the region — were well advanced. Aussat therefore regarded the initial contract as the beginning of a long-term relationship.

New Zealand observers noted that the deal was signed in the dying days of the NZPO in its present form and that details may have to be sorted out by a new telecommunications corporation.

Industry sources speculated that Aussat may have offered the Post Office an "early bird" discount to get customers for the third satellite. But Aussat has denied reports of slack demand, and other sources said NZPO may have decided to get in early to reserve its spot in a possible queue.

The satellite capability will relieve pressure on the terrestrial telephone network and provide users with sought-after "route diversity". Some large users have backup links that are nominally on different routes from the main link but even the NZPO has admitted that load redistribution could mean that the main and the backup links end up on the same cable.

The problem is worst on the Christchurch-North Island link which has only one very limited-capacity terrestrial alternative link, according to Terry Ballard of the Telecommunications Users Association of New Zealand (TUANZ).

But while users would therefore greet the Aussat deal with considerable relief, the high-bandwidth offering would probably entail higher tariffs, said Ballard.

The basic service is 48k-bit/sec, compared with the prevalent 4.8k-bit/sec and 9.6K-bit/sec links, and it would probably be more difficult and costly to split the satellite link up between several low-speed users, he said.

On the other hand, the NZPO has made noises about letting users get on to the satellite service early during an experimental phase so they can gain handson experience in operating a satellite link.

The association was not formally consulted about the Aussat tie-up, but it is in any case facing more down-to-earth problems at present. Ballard said: "At the moment we are more concerned with arrangements for the (terrestrial) Digital Data Service," scheduled to come onstream early next year.

And anyone hoping for a second satellite channel to Australia will be disappointed: the two countries are signatories to the Intelsat treaty, and under existing agreements the Aussat service may be used for domestic purposes only. Trans-Tasman traffic must go via the Intelsat link — so companies with a need for both local and trans-Tasman communications will have to have two aerials pointing in different directions.

A baseband link capable of carrying television signals to outlying areas or teleconferencing traffic between centres is a big part of the capacity that has been leased.

Whether such services will be economical on a purely local basis will depend crucially on the charges New Zealand's new telecommunications authority decides to impose.

Radio net gets cheap data channel

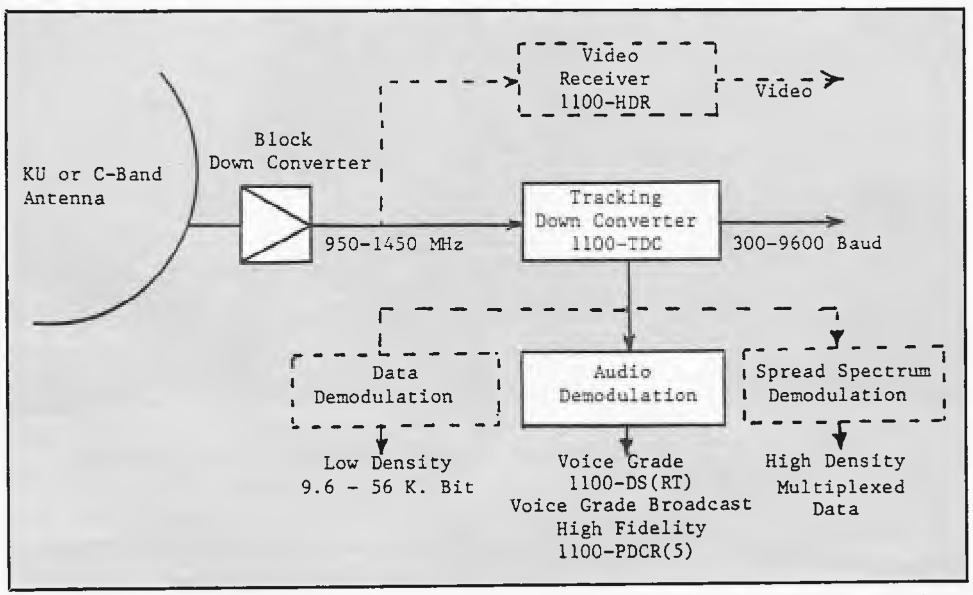
SYDNEY — Regional stations on the Macquarie Radio Network get a cheap low-speed digital data channel as part of the satellite multipoint delivery system — thanks to an innovative concept developed in co-operation between the broadcaster and a US manufacturer.

The system, shown in operation at the recent Aussat conference in Sydney, makes use of the excess capacity of a signalling channel to deliver 4.8-bit/sec of data to personal computers linked to the network's "news computer".

The Ku-band single channel per carrier (SCPC) system developed by Microdyne of Florida uses the digital pilot reference — a PSK (phase-shifted keying) carrier using a 20kHz "gap" in the video/audio signal. It is normally employed for stabilising the broadcaster's transmission frequency.

The pilot has a 15.6k-bit/sec data rate of which only about 6k-bit/sec are used. In the Macquarie-instigated use of the pilot, half of this extra capacity is used to uplink the composite output of the network's news computer, including AAP and other news services, as well as the various network stations.

The signal is received by participating stations on personal computers connected as terminals to the RS-232C port of a Microdyne 1100 TDC tracking down converter. Apart from tracking out local low noise converter's (LNC) frequency errors, the 1100 TDC de-merges the data component.



Block diagram shows how the tracking-down converter is used to obtain data channels.

Microdyne senior applications engineer James Grabenstein said the 1100TDC's output could also be used for FM and telephone-grade voice as well as low-density (9.6-56k-bit/sec) and spread-spectrum demodulation (high-density multiplexed data).

According to a paper delivered at the Aussat conference by Keith Ramsay, marketing director of local Microdyne distributor Leatham Electronics (Australia), use of the 1100 TDC, a low-cost LNC, low-cost antenna and SCPC demodulator kept the cost per receiver site to under $A17,000.

The audio-plus-data system worked out cheaper, in some cases, than a year's rental of a leased line, he said.

According to Ramsay, Macquarie is planning to expand the tracking down converter concept to multiplex data for station automation.

It was also considering encryption schemes based on scrambling the pilot data stream.

'D' — dark horse of the comms race

NORWALK, Connecticut — The ISDN's so-called D channel is the dark horse of the digital communications race, likely to carry unforeseen benefits for consumers, according to a US research report.

Interfaces to the D channel represent an unexplored opportunity for communications equipment makers, particularly packet-switching vendors whose markets stand to be eroded by the introduction of ISDN, according to a report form International Resource Development Inc.

The report argues that much of the ISDN discussion has focused on the B channels as the main transmission channels for voice, data, image and text (see table).

The D channel is intended to carry telemetry and alarm signals for its primary function of network control: at least one 16K-bit/sec D channel will go to each ISDN subscriber for this purpose.

But the IRD researchers argue that because this is far more capacity than required for signalling, additional uses will be made of the facility.

According to senior analyst Leslie Townsend, the D channel will provide low-speed transmission capacity for business and consumer applications.

She said: "The D channel primarily will provide packet-switching services, including access to public packet-switching networks.

"It can also provide a means of electronic banking and funds transfer, electronic mail, energy management, facsimile, some personal computer networking and, if it has a future, videotex."

At-home medical monitoring services, remote meter reading, home security and alarm signalling and stock market monitoring services are seen as other potential uses.

Initially, the report said, the D channel will compete with the so-called derived channels (data-over-voice, data-under-voice, and speed spectrum), and with the wider ISDN channels B and H.

But the economies to be had from an available channel with excess bandwidth for which low tariffs can be set, would prove to be attractive.

IRD forecasts big growth from the middle of the next decade onward, with packet-switching vendors among the early converts.

"These are the vendors who have the most to lose — and to gain — in this market," the report says.

"In addition, many of the datacomms manufacturers — the modem, mux and protocol converter people — will find this an attractive market."

ISDN CHANNELS

TYPE	BIT-RATE (Kbps)	TYPICAL NETWORK ACCESSED	MAIN APPLICATIONS
B	64	Circuit-switched	• Digitised voice • High-speed data • Digitised facsimile
D	16	Packet-switched	•Signalling information for ISDN circuit-switching • Low-speed user data • Telemetry
D	64	Packet-switched	• Signalling information for ISDN circuit-switching (the 64 Kbps D channel is primarily recommended for interface with PABXs)
E	64	Packet-switched	• Signalling information for ISDN circuit-switching (the E channel is recommended for use with the CCITT signalling system No.7)
HO	384	Circuit-switched	• Fast facsimile • Video (e.g. teleconferencing) • High-speed data
		Packet-switched	Packet-switched information
H11	1,536	Circuit-switched	Same as HO
H12	1,920	Circuit-switched	Same as HO

Table 1: How ISDN channels stack up. *(Source: International Resource Development Inc)*

ANZ Bank gets message

THE ANZ Bank's offices in Melbourne, Sydney and London are the first locations to go online with what is claimed to be a secure high-throughput message switching system capable of connection to a wide range of international public networks.

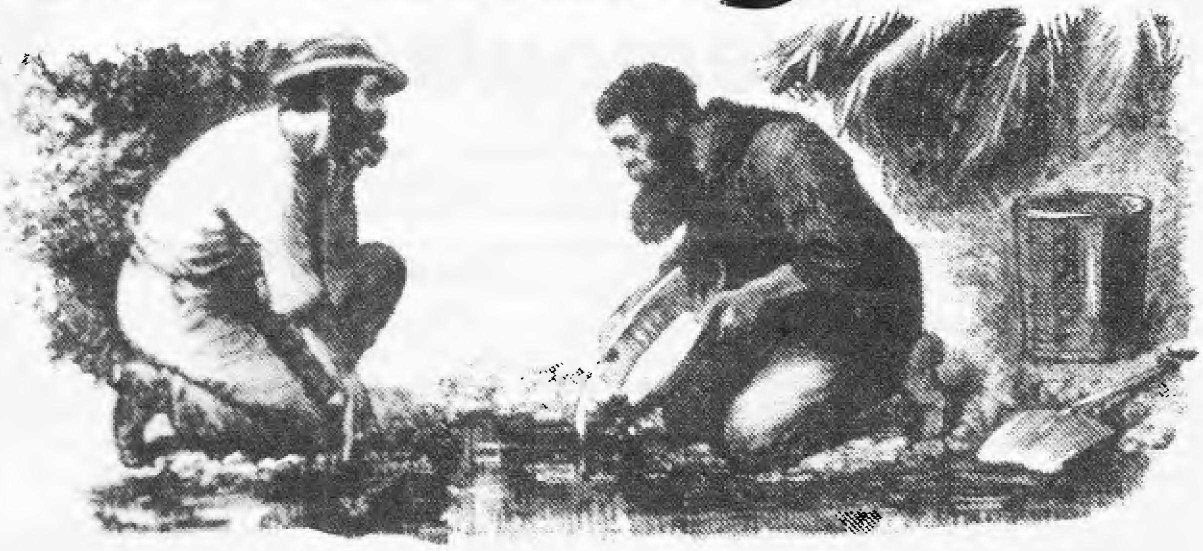
The ANZ and Macquarie Bank recently ordered more than $A1 million worth of Case Communications' Beeline messaging equipment and software.

For the ANZ, security of financial traffic over public networks was a prime consideration. Using the Case system's automatic test key method, ANZ will be able to generate authentication keys and validate and transmit them quickly and securely.

Messages prepared offline are downloaded to the Beeline system via the bank's ANZpac private X.25 network, Austpac leased lines or the switched telephone network for automatic key generation and transmission. All messages are logged throughout the bank's network and will be authenticated and distributed to recipients with minimum operator intervention.

In the case of Macquarie, rapid growth called for extending the bank's messaging facilities. Installation of Beeline is expected to result in efficient telex line usage, easy message broadcasting to electronic mailboxes, and secure automatic transmission and distribution of internal traffic.

Sifting the sand for UNIX gold?



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EDITORIAL

THE Christmas season fosters a conciliatory mood, so if I lay off Telecom for once don't think I've run out of ammunition. (The calls I got after my last blast at our "colossus with feet of clay" would have made sure I didn't, all being of the tenor of "the things I could tell you about Telecom" — and then proceeding to do so . . .)

And, as will be apparent elsewhere in the paper, Telecom got so much more high-calibre flak recently that it would be presumptuous as well as uncharitable to add to the devastation.

So let me turn instead to things closer to home: this magazine, and its readers. First, the best news: Communications World *is going monthly with the next issue after the holiday break, and there will be six extra editions, covering special topics from networking to regional communications.*

Now for the good news: the market for information about communications topics has grown by leaps and bounds in the past year, and several contenders are seeking to satisfy this need. It is gratifying to see that since we started out as a bi-monthly last February, almost 8000 people — more than half of them communications practitioners proper — have asked to receive Communications World *to keep in touch with developments in the field.*

Most of our other readers are vitally interested in communications, too: they include directors and general managers (13 per cent), company secretaries and financial controllers (seven per cent) and office administrators (six per cent) among others.

Communications World's *readers come from all areas of business and industry: nine per cent each are found in the utilities/transport and wholesale/retail fields, respectively, seven per cent each are in government positions and in the finance and banking industries, five per cent in mining/construction/oil industry, and so on.*

As you can see, we have been able to glean some general information about our readership, and no doubt it is going to be of some interest to our advertisers. A proper analysis by an independent research organisation will no doubt throw up other interest factors.

But I would like some more direct feedback from YOU to make the magazine more useful to you in the coming year. I would welcome both criticism and encouragement from our readers. Write in and tell us what you want covered in more detail, what you want less of (and why), or ring us up (as in DIALog).

Make our motto your resolution for 1987: Keep in Touch with Communications World! *Meanwhile, Merry Christmas and a Happy New Year.*

Luis Huesch

Aussat reopens debate on carrier deregulation

By Tom Amos

NEW Horizons '86, an Aussat exposition on the future space telecommunications options for all Australians followed a now clear Aussat theme of deregulation of the local telecommunications industry. The theme followed was that deregulation would allow choice along with cost efficient communications for Australia in the 1990s.

The words espoused by the Aussat MD, Graham Gosewinckel, echoed around the few hundred gathered when he called for liberalisation of the marketplace to allow Aussat to provide competitive, rather than complementary services.

Many have risen to such a challenge but few have ever succeeded without the privatisation that goes with the liberalisation of a monopoly. The Australian TV industry only recently felt the winds of change when existing monopolies were challenged, and then changed beyond what was originally desired.

Cases in point are in both the UK and Japan. Both countries have recently deregulated their domestic telecommunications and have at the same time privatised to allow effective competition. Whether Aussat is wanting true competitive services or a duopoly with Telecom was not addresssed during both days of the exposition.

It was not adequately explained that in fact Aussat's current charter is to provide complementary services to our national carrier, Telecom and that section 14 of the Satellite Communications Act expressly forbids either PSTN or PDN services on the satellite.

Private networks for private use are allowed, but as most discussion centred on remote phones and other networks which obviated the need for the Telecom system, the issue of third party carriage on satellite for these switched services needs to be solved.

The regulatory framework would have to change to accommodate Aussat's expressed desires. The public debate on this issue is not at all apolitical, and the public debate would, indeed, be interesting, given the history and the potential participants.

The conference was organised around a number of Aussat's current major users who related either their experiences or sales pitches to satellite use. The areas covered included television and the potential corporate areas for private and condominium services. These latter services have, it was admitted, not carried third party traffic as yet — although the desire was to do so, God and the unions willing.

Exceptions to this were the Queensland government, whose solid stance and demonstrable success in applying satellite transmission to solve difficult social and economic problems throughout Queensland eclipsed most other single user achievements.

Doug Rowell of the Queensland Department of Industrial Development aptly summed up the potential for State governments utilising the satellite by explaining the philosophy of the Q-Net system and its advantages over Telecom services for particular sections of the community.

A strong point of being able to manage change from Telecom services to private was illustrated by Q-Net's frustration with the current work practices in some areas which were now at the forefront of that change. A possible warning or challenge to other organisations considering the Q-Net route.

(Continued on page 8)

Claims made about Tosbox

LETTER TO THE EDITOR

Ivor Livingston
Director
System Solutions Pty Ltd

WE are concerned at the claims made in your article on Tosbox (*Communications World* Nov, 1986, p26). In particular we refer to the statements:

"Tosbox . . . is Telecom-approved for mode 1 direct connection to the telex network."

"Tosbox is . . . the world's only standalone computerised telex system that works in full conversational mode."

When the Australian-designed and manufactured Telexlink was granted Mode 1 approval — a historic landmark in the connection of third party equipment to the Australian telex network — it became the first interface to permit connection of computers to telex without the need for a Telecom standby machine.

As the holder of the Telexlink permit we can confirm the following details.

Authorisation No: C86/23/1495
Supplier: System Solutions Pty Ltd
Apparatus: Telexlink Mode 1
Connection: Telex network — Telecom recommended connection Mode 1
Note: A standby Telecom teleprinter is not mandatory.

Can Offcom provide details of their Mode 1 permit, or a permit for Tosbox to connect direct to the line (without an external isolator)?

With regard to full conversational mode, message switches from all over the world (including Extel, Lane, Sidereal) have been doing this for years, not to mention Telexlink the Australian-designed product.

WE have edited Ivor Livingston's letter to avoid possible defamation suits, but the point he makes is well taken. I was led to believe, at the time of the official release of Tosbox, that Mode 1 permission was available and certainly the documentation clearly refers to a "standalone" machine. A colleague well respected in the industry apparently succumbed to the same ambiguity. However, Offcom marketing manager Norman Young now assures me that he merely claimed to have applied for a Mode1 connection. — *Ed.*

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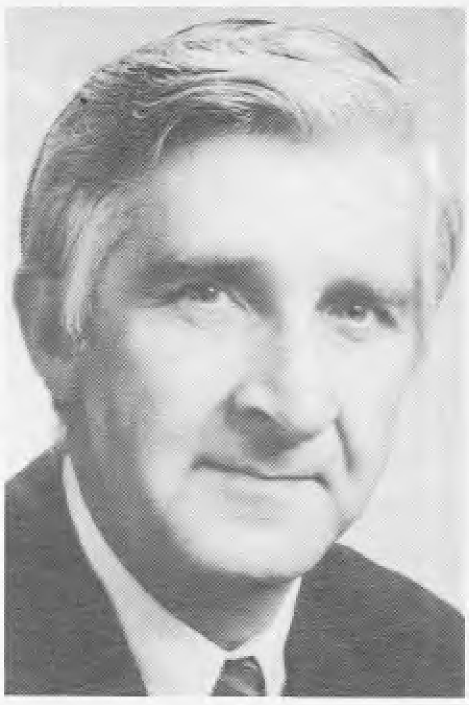
Aussat wants a 'new deal' on regulations



Graham Gosewinckel . . . "need to facilitate rather than stop new technology".

By Luis Huesch

AUSTRALIA'S satellite carrier Aussat, accelerating in its trajectory toward full profitability, now regards our regulatory framework as its "major challenge" and wants "a new deal" in telecommunications, managing director Graham Gosewinckel told a capacity audience of present and potential users recently.

Gosewinckel, addressing the opening session of a two-day Aussat-sponsored satellite communications seminar in Sydney, said there was now a need to reduce regulation, to facilititate rather than stop new technology.

The challenges ahead "are not with the technology but with further development of the regulatory framework, a framework which needs to recognise the worldwide move towards reduced regulation in telecommunications . . . "

His remarks, the strongest such public statement ever from the 25 per cent Telecom-owned corporation, set the tone for many of the subsequent presentations and discussions, and Gosewinckel used the closing session to reinforce the carrier's position.

He told a panel meeting: "We want the momentum to increase" for telecommunications deregulation. "We support you all the way" in having facilities such as those offered by Q-Net 'unlocked' for the larger community.

It was "stark raving madness" to prevent things like education for nurses, and education in general from being made available when the technology was there.

"The job of the Department of Communications is to facilitate communications, not to stop them," Gosewinckel said.

Gosewinckel had earlier told the 400-strong audience (another 200-odd people were turned away at the doors) that the carrier was now shifting from debt servicing to revenue generation. Its viability was "beyond doubt," with 80 per cent of its satellite capacity contracted for by the end of next year.

Aussat was now tying up smaller services, while at the same time consulting its major customers on the requirements for the next generation Aussat satellites, due to the early 1990s. Aussat was intent on getting its next bird up early to allow for a "generation overlap".

Gosewinckel said Aussat aimed to be Australia's best communications company. Another of its major goals was to boost Australian content in the next series of satellites.

Aussat marketing manager Alan Harris also called for "minimum restrictions" on the fledgling carrier. There was "not a lot of political restriction" in the Satellite Communications Act, the basic constraint being one of non-interference, Harris said. Aussat aimed to provide utmost flexibility in bundled or unbundled services, including earthstations and microwave links.

It was flexible also in writing business: contracts for transponder capacity at present ranged from 10 minutes for itinerant TV to 15 years.

Aussat network manager Bill Egan pointed out that this flexibility extended to customer configuration of their networks, via the control station at Belrose, Sydney.

He said the ABC — now Aussat's largest single customer — would soon instal a radio and TV switching unit to reconfigure all its uplinks and downlinks.

Aussat was also starting to offer customers end-to-end test packages. Egan said Aussat transmission reliability in most cases exceeded the corporation's target of 99.95 per cent. The AAP-Reuters information service to newspapers, radio and TV stations and business clients nationwide had achieved 100 per cent availability, as had the Bond Petroleum voice circuit and the Eastnet mining network.

'Fixing toasters' is out — or is it?

COMMUNICATIONS WORLD

at AUSSAT '86
NEW HORIZONS

A TELECOM manager veered from vexation to heresy over the issue of customers "fixing toasters" — in this case replacing circuit cards on Iterra customer earthstation equipment.

Iterra Network Service marketing manager Cliff McAlpine ended up driven to such frustration under questioning that he blurted out that Telecom's policies on interconnect and maintenance had to be viewed against the "industrial relations background".

He was answering a question about whether an Iterra customer with his own earthstations would be able to make a simple module exchange at a remote site — something described earlier by a user as being "as simple as fixing a toaster".

McAlpine initially said Telecom reserved the maintenance right exclusively. "We are not talking about a simple service — we are talking about an extension of the switched public network, and I do not think that is something for people who fix toasters to play around with."

But when pressed further on "first-in maintenance" by a customer's qualified staff, he appeared to lean toward heresy: "I cannot give you a categorical answer that Telecom will NOT consider card replacement or first-in maintenance to be handled by the customer.

"If the customer wishes to discuss this with Telecom it is something we would certainly consider — that is about as far as I can go at this stage."

Another interpellant noted that Telecom thus seemed prepared to yield on the question of fixing earthstations, which considering the "72,000 miles of fairly good electrical insulation" was perhaps not so dangerous.

"If you happen to hang a very small PABX off the earthstation — and I can assure you today's small PABX is not quite as complex as a toaster — Telecom has refused the right for the person who owns the earthstation and owns the PABX to maintain the PABX in those circumstances where the PABX and the earthstations are interconnected to the network."

McAlpine replied: "The policy of Telecom maintaining a monopoly over PABX maintenance . . . is something I am in no position to argue with.

"You have also got to be aware of the background as far as Telecom's industrial situation is concerned."

Asked if Telecom's PABX and earthstation maintenance policy was dictated by the unions, he admitted that "to an extent that may be the case. . ."

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Call to free up technology

(Continued from page 6)

Telecom was conspicuous by its absence and with no forum or ability throughout the conference to put the alternate view, the balance tipped away from the current practices achievable for private or alternate services. Perhaps next time senior Telecom people will attend. It appears that Telecom hopes it is all a bad dream.

The deregulatory theme continued on throughout the conference with the discussion spilling over into the technical arena. Of course future satellites are now currently being planned and so the capacity and coverage of such satellites is very dependent upon relaxation of the rules of use if additional traffic is to be carried via the medium.

Cost structures are always dependent upon the scale of operation. The economy-of-scale points for the next generation are directly linked to the traffic and traffic mix. Aussat hopes not to get it wrong, as the stakes are very high. It has, of course, now cunningly reactivated the Davidson debate with a view to the Aussat future. As with TV, the future could be controlled by someone completely different.

To round out the conference there were exhibitions of hardware which ranged from trailers to PCs, and a walk-around talk to the exhibitors soon told the story of delay and a slow initial market. Few private satellite equipment suppliers have placed systems and the deregulatory theme, for some, may have come a few years too late as lead times in this market are very long and expensive.

Still a long way from open slather

REGULATORY issues loomed large in several of the question-and-answer sessions.

Golden West Network satellite division manager James Lange, discussing the regulatory environment in which his network had to operate and seek profitability, said that while "we are still a long way from the open slather in the US," certain arrangements were possible.

He cited these regulatory issues and their possible "bypass":

■ Resale of capacity: "according to the Satellite Communications Act you are not allowed to resell capacity. You are however allowed to do value-added provision, and value-added provision is a tried and true provision within Telecom . . . Certainly when you use our system, adding the B-Mac encoding adds value to the system and therefore we become a value-added provider."

■ Third-party traffic: "another term that has yet to be defined. Television stations regularly sell time on their systems to advertisers . . . that is not considered third-party traffic . . . we also sell large blocks of religious programs and . . . that is not regarded as third-party traffic."

"We do not see then any problem with the use of RCTS television capacity in terms of third-party traffic. For capacity outside our broadcast signals Aussat has indicated a perfect willingness to enter into back-to-back agreements so that whoever is using our capacity enters a contract with Aussat, and our transponder cost — and thereby our government subsidy — is thereby reduced accordingly."

■ Common user group — "an issue which has been vexing all of us in terms of deciding what is and what is not a common user group . . .

"The only thing I would like to say on this is that Aussat has shown itself much more liberal in its interpretation of what a common user group is and I think you will find Aussat pretty easy to deal with in that regard."

'Interconnect policy is fraught with minefields and pitfalls even for the Telecom people . . . they have not yet figured out what they mean by it'

■ Interconnect — "as we have heard . . . interconnect policy is fraught with minefields and pitfalls even for the Telecom people; they have not yet figured out what they mean by it and I do not propose to tell you that we have got the solution.

"If you use our capacity you will have just as many interconnect problems as you had if you used anybody else's."

Dr Lange pointed out that there was about 20MHz "excess raw capacity" outside the B-Mac transmission which was available for lease from Aussat under back-to-back contract.

This outside B-Mac capacity amounted to about 50 SCPC voice channels or three 2M-bit/sec streams. It was available on the relevant spot beam during regular broadcast hours but could be switched to a national beam during the overnight downtime.

RCTS licensees such as Golden West would have a network of earthstations around their spot beam which could be used for up-and down-linking, and there was "no reason that this capacity could not be accessed from an Aussat major city earthstation — or from customer premises".

Asked by a Department of Communications representative what uses he had in mind for this excess capacity, Dr Lang said: "What I have in mind is private networks for mining or other large corporations that have long-distance or multi-nodal networks or branches, or for government departments — for example for the State government that has a need for a long-distance communication system . . . a private leased system that came in a little bit under the competitor, a competing terrestrial system."

Satellite delay 'nearly all ironed out"

POTENTIAL satellite users worried about sending high-speed data interactively via satellites because of the inherent satellite delay have been reassured that this is a "solved problem".

In answer to a question at the conference, Brian Perkins, assistant general manager of AAP-Reuters Communications, said that most suppliers now had ironed out any incompatibilities apart from those with "very old protocols".

In the M/A-Com Integrated Satellite Business Network — which AAP-Reuters Communications uses for its so-called small-dish service — a separate protocol was used on the satellite link and intelligent processors at each end which interact with the customer's computer equipment.

"In effect the customer's computer equipment is seeing only a line between it and the earthstation, and the satellite delay is effectively taken out of the loop.

"You are able to operate the standard protocols, the SNA, the X.25, as though the satellite link was not in there — it is a fairly clever protocol."

Perkins added that "of course if you have some of the very old protocols, or older protocols, bisynch (IBM's BSC) for example, that become a different problem.

"M/A-Com has not developed the processor to handle some of the older protocols," he said.

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Telecom dips a toe in X.400 with Teletex

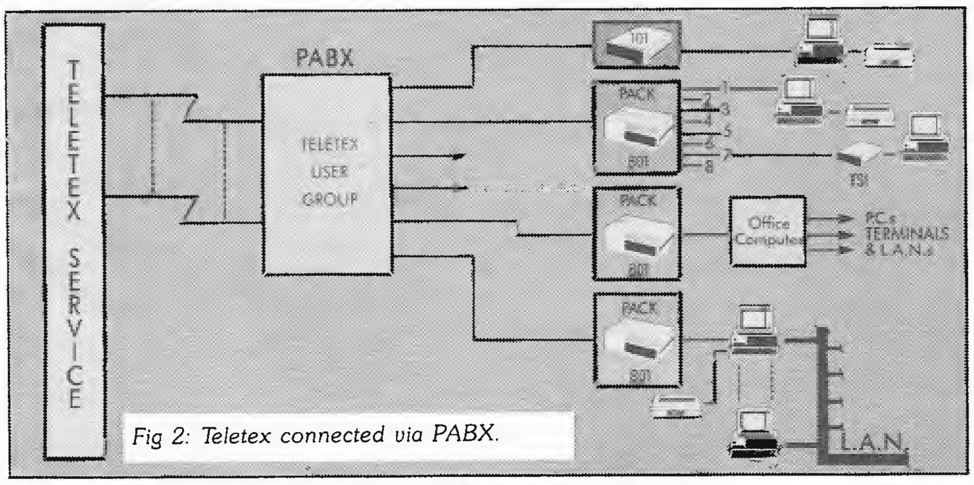


Fig 2: Teletex connected via PABX.

By Luis Huesch

SYDNEY — Is there life after telex? Vendors of telex machines and PC-based workalikes will vehemently deny that telex is dead or even dying. Facsimile makers, on the other hand, never had it so good: the number of fax machines installed in Australia is thought to have doubled in 1986 to some 40,000 units — not far behind the 46,000 installed telex machines.

Electronic mail in its various guises can also double quite nicely for document transmission, thank you very much, and with the right kind of host or bureau can even manage binary file transfers. Modems and dedicated, dialup or packet-switching lines are very much *en vogue* for transferring files and programs . . .

So why is Telecom Australia jumping into the ring, as one of the world's first PTTs to do so, with Teletex (TTX), a not-quite-standardised-yet protocol for text messaging using 2400 bits/sec transmission and a 309-character alphabet?

It obviously sees a confluence of efforts in the world for a non-IBM open standard for message exchange: CCITT recommendation X.400. It is the open-ended nature of the evolving standard that attracts Telecom.

"If we could alter telex, we would have built on telex," says TTX product development manager Ralph Schmidt. Interconnection to the domestic telex network is already provided for Teletex users.

A Teletex marketing team, led by Schmidt, recently outlined Telecom's strategy for the new offering to consultants in Sydney and Melbourne. They see three potential user segments as natural Teletex markets: general correspondence, file exchange and business forms transmission.

Telecom's TTX marketing strategy will be three-pronged, and aimed at:

- Interconnecting office computers — an area where Telecom sees considerable scope in the early years of TTX, and where it is concentrating its software "development aid".
- File exchange, including binary files, between PCs and local area networks; and
- Wide-area networking — Telecom expects early TTX users to come aboard as closed-user groups (CUGs), perhaps as members of an industry or association, and it would "look at the needs of communicating between CUG members". "We will mould the technology to the user's needs," said Schmidt. (See Fig 1 for a schematic representation of the internal connectivity options open to Teletex customers.)

One of the great advantages of TTX, apart from greater vendor independence, is the fact that it facilitates internal document-handling. Files received once in electronic form can be stored, manipulated and redistributed without too much trouble.

Here — and at the interworking level with other services — is where the Australian implementation of Teletex is claimed to be at the leading edge: the original West German supplier mbp is said to be keen to take up the computer file transfer enhancements developed in Australia. Apparently, the original German version supported only Wordstar.

The backroom boys are still debating which standard to back for formatting the actual documents transmitted (see separate article on standards on page 14).

Without, hopefully, oversimplifying Telecom's prolonged answer to my question about support for IBM's Document Content Architecture (DCA), it appears that the local TTX developers are hedging their bets: they would love to opt for something better, such as the OSI's Office Document Architecture (ODA). Interestingly, a diagram depicting the future integration of Teletex with other text services (and later image and voice) shows ODA as the bridge . . .

But they are aware of existing market pressures — and a lot of word processing package vendors have started to offer DCA compatibility. As the man said: "We may have to come to terms with DCA, but we are hoping for ODA".

In the meantime, Telecom TTX supports a handful of "standard" WP programs ranging from Wordstar and Word to Multimate and Displaywrite III. What it means is that if a user runs Word and sends a Word-formatted file to another machine running Word, the recipient can use and edit the incoming file "as is". With a common WP interface standard, the recipient would be able to do the same even when running Multimate.

Telecom also asserts it is the only PTT worldwide that caters for complementary text services as a whole, and that it is ahead in TTX applications development because it is "looking ahead beyond mere correspondence".

Basically, Telecom says, its new service satisfies business clients' needs for document transmission with:

- Message integrity — meaning that as with Telex, transmission and reception are identified and Teletex files received and stored in the TTX black box cannot be erased until they have been printed out. Two levels of passwords security and usual encryption techniques can be employed.

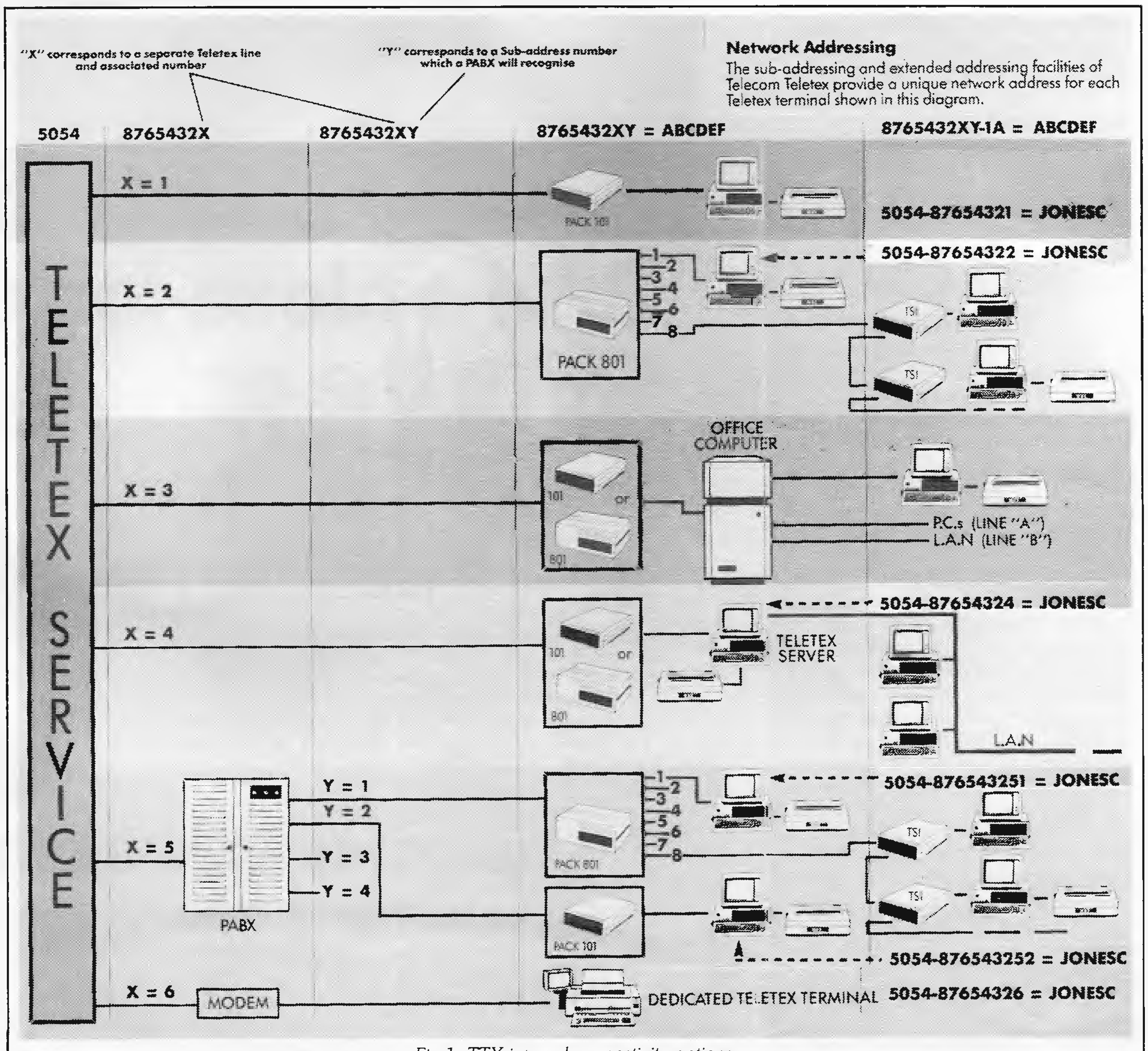
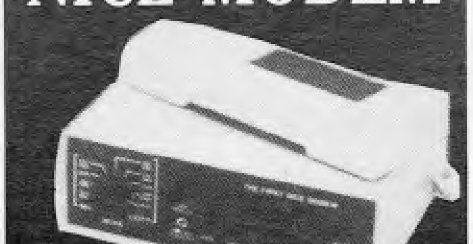


Fig 1: TTX internal connectivity options.



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- ■ National coverage — this of course is Telecom's hope: all it can do is ensure the network connection and carrying capacity.
- ■ Part-time service — based on dialup rather than on dedicated connection; the UTC black box of the service receiver is required by Telecom to be online 24 hours a day with 95 per cent reliability; and
- ■ Capacity for computer file transfer, including binary files between compatible machines and programs — with "sophisticated error recovery". Claimed bit error rates are "less than one in 10^9".

This is not all: according to the documentation provided and statements made at the Telecom briefing, Teletex users can string PCs, including incompatibles such as Macintoshes, PCs and Wangs, together via a Teletex adapter even WITHOUT an outside Teletex line!

Consultants were shown diagrams explaining how users can make a PABX part of the Teletex distribution system OR the local area network (see Fig 2). In this case the PABX is "segmented" to dedicate a number of lines to a notional "Teletex User Group". (It will be interesting to see if, in the light of the rather liberal policies for Teletex outlined below, users may "do their own thing" within such a partition . . .)

In addition, Telecom will provide interworking with existing services such as telex, Telememo (and presumably other text services such as OTC's Minerva) via what it calls conversion facililties, so that the user of any of these has all other service subscribers "within reach".

'As liberal as possible'

To woo business users to Teletex, Telecom stresses that only minimal extra equipment is needed if clients already have an electronic typewriter, a personal computer, or a terminal with a host link: all that is required is a standalone Teletex adapter and host software.

Of course there is also a purpose-built Teletex station (the Siemens T4200) available if a customer's traffic can bear it (a dedicated machine from telex supplier Sagem still seems to be in the certification pipeline — wonder what they did wrong!).

But Telecom, at least this particular section of the monolith, made it clear that it will go out of its way to encourage third parties to enter the Teletex market with products and services. Indeed, Schmidt sees the entire market as entrepreneur-driven: "You go in there, we'll follow you," he said. While Telecom could choose to regulate third-party entry away, it would be "as liberal as possible" to get revenue flowing from Teletex.

Despite its claim to be ahead with applications, the overall lack of applications is still a daunting marketing bottleneck. In particular, the software that allows the interworking of a number of office computers with common Teletex access is not here yet: only the Wang VS office system can at present be integrated apparently because this is the OA system Telecom itself is using.

Teletex traffic will travel business class or first class: the bulk will be handled by what Telecom describes as "the best part of the (PSTN) network" — AXE exchanges and IDN lines with all-digital switching — all it would need to make it full ISDN would be a digital tail.

Apart from this circuit-switching network, which "users can take and use for their own applications," high-volume traffic users would be recommended to take the Austpac route. But Telecom expects only a minority to make use of this option "because of the pricing".

Telecom's tentative timetable for Teletex's future is to have full interconnection with international telex by May next year, followed by Austpac access in July. Telememo and international TTX gateways are to follow.

(Continued page 12)

'State of the art' 8088 boxes

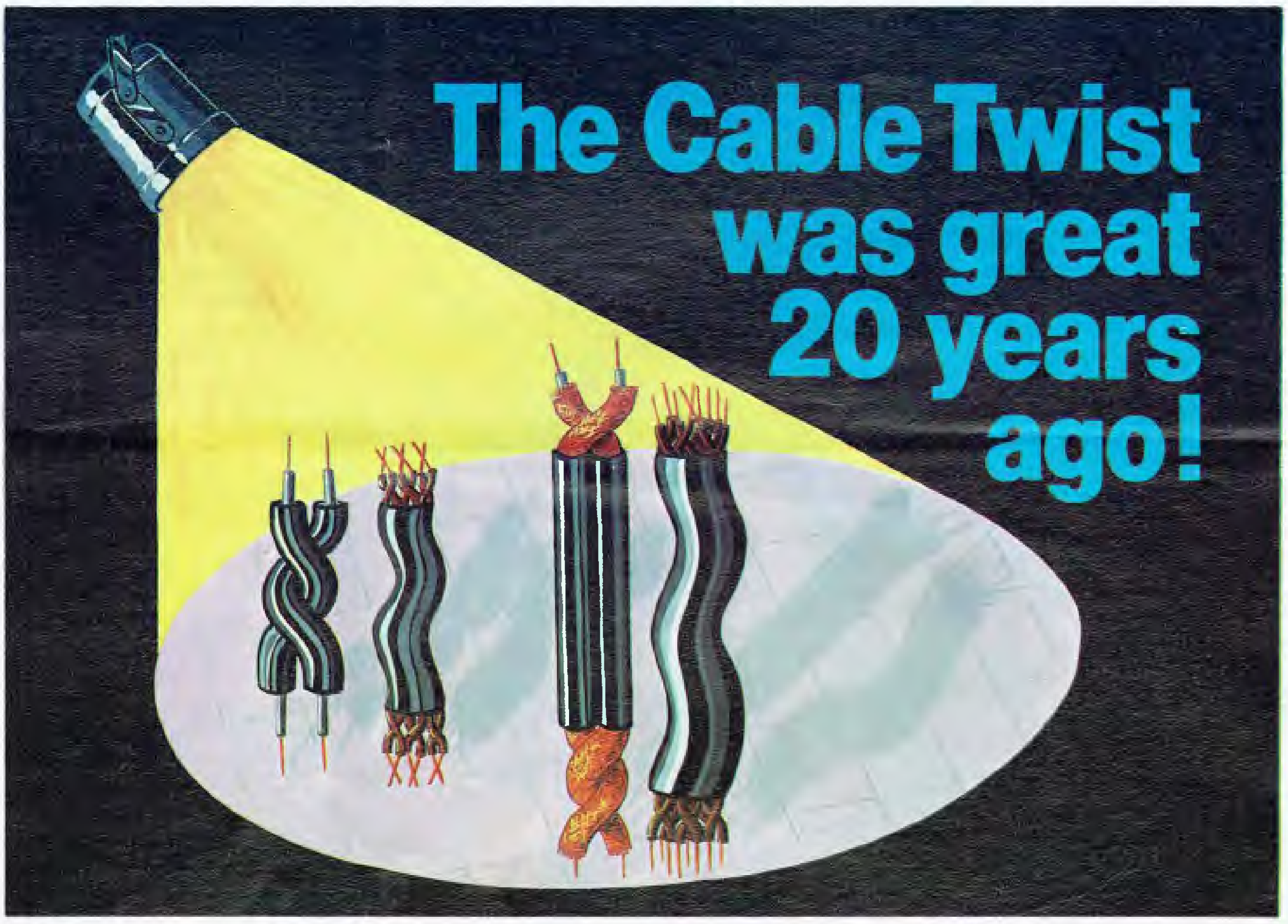
TELECOM Teletex Packs, from German protocol converter pioneers mbp, are described as "state-of-the-art" in Telecom brochures, but they contain nothing more fancy than an 8088 processor, conversion firmware and either 256K-bytes of battery-backed Cmos or 800K-bytes of non-volatile bubble memory.

The buffer capacity is said to range from around 128 typical A4 pages on the single-port Pack 101 to some 400 pages on the larger eight-port Pack 801. An au-

An automatic log is also kept of all transmissions, and this can be printed out daily.

The host interface is RS-232C (CCITT V.24) and the modem interface conforms to CCITT V.22bis.

Pack 101. *Pack 801.*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Needs of a strategic

NETWORKING, apart from any other use, can be a very cost-effective way of tying together computer equipment from different vendors. ROB ROHRLACH looks at what considerations should go into the process of specifying a strategic data communications network.

FOR too long the procurement of a network has been seen as an adjunct to a host computer tender — a carryover from the early days when a network had to be host-dependent.

Over the past year or so, this practice has been replaced by the selection of corporate networks which are independent of the host computer suppliers.

The result is an unprecedented freedom of choice, allowing organisations to choose computers which are best for each task — rather than compromising performance to obtain compatibility.

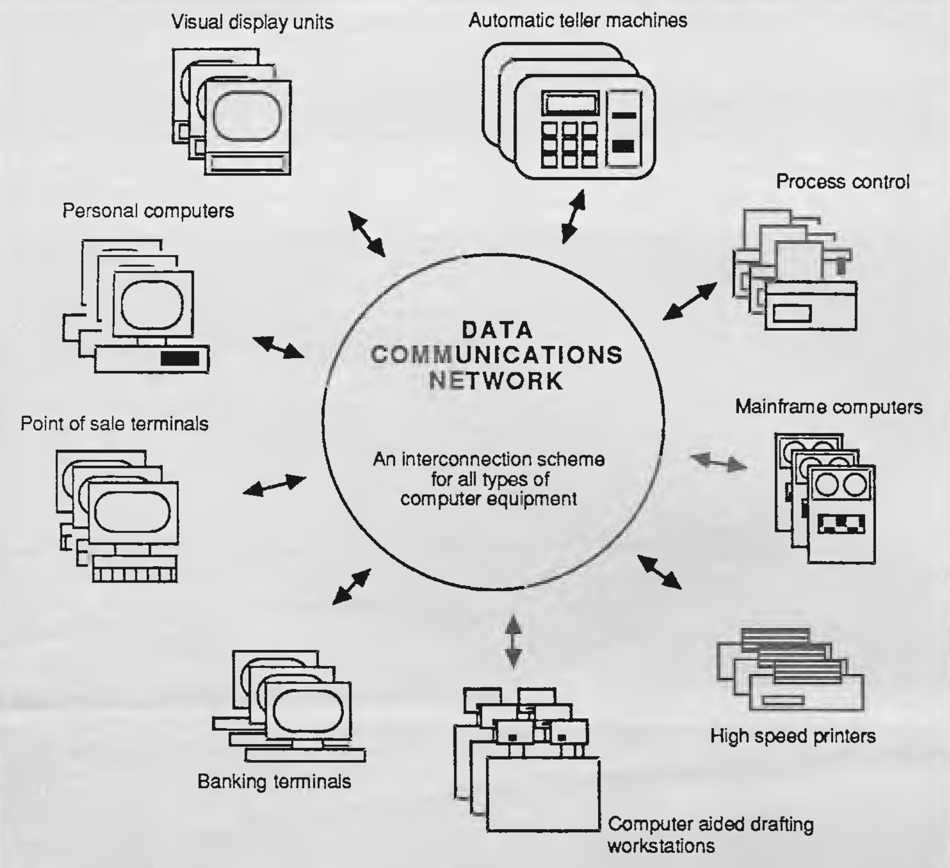
Visual display units
Automatic teller machines
Process control
Personal computers
DATA COMMUNICATIONS NETWORK
An interconnection scheme for all types of computer equipment
Mainframe computers
Point of sale terminals
High speed printers
Banking terminals
Computer aided drafting workstations

Fig 1: *Concept of a data communications network.*

If we look at what a data communications network is required to do we see that, basically, it must provide the means for connecting all sorts of computing resources. This is illustrated in figure 1.

A modern network must be able to handle much more than host computers and terminals. The range of computer-based devices is large and growing; it includes process control, factory robots, teller machines, office equipment, distributed processors and many others.

The network is a strategic resource in its own right, and must be independent of any particular computer or computing resource.

To properly fulfil its role, the network must not degrade or inhibit the performance of the various computing resources connected to it. Figure 2 shows the essential characteristics a network must have if it to perform successfully.

Manageability means that the network can be managed as an entity. It should be controllable by the network manager and provide facilities such as performance and user statistics, security control, monitoring and diagnosis.

Reliability is critical, and a good network should deal with component failures with only minimal or no loss of data.

Flexibility is obviously vital in the ever-changing modern computing environment, as is expandability.

High performance is related to the ability to handle all network traffic without introducing significant delays, even under maximum designed load.

A cost-effective network does the job more efficiently and at less cost than any other alternative.

What are the essential functions which a network must provide in order to meet the criteria? (Figure 3 illustrates the items outlined.)

Almost every computer vendor has a different set of communications procedures or protocols. Therefore, the first function a network must carry out is that of connecting to various protocols by means of gateways.

Gateway is a general term for connectivity, each gateway allowing the network to talk to a particular make or type of equipment. The network must provide services which emulate the protocols required, so that a brand X device thinks it is talking to another brand X device.

Protocol emulation means that incoming data can be extracted from the protocol envelope. Also, the terminal control characters can be extracted from the data by data stream conversion and acted upon by a terminal emulation function. This allows terminals to be connected to different hosts via the network.

An important concept here is the use of a low-cost asynchronous terminal as a universal terminal. The network provides presentation services which make the terminal act as if it were a specialised terminal native to whichever host it is connected to.

Gateways include connections to other networks such as X.25 and SNA. Also, a network can use gateways to enable it to act as a bridge connecting two networks of the same type.

> *'The network is a strategic resource in its own right'*

Having provided the means for connecting to various computing resources, the network must also be able to establish connections between them by switching. A connection may last for a session, or just for the delivery of one message. An important factor is network integrity, which must guarantee the delivery of messages in either situation. Economical use of network links often requires messages to be multiplexed over a single access connection.

Next is the control function, which includes both the operating system or executive software and the means to manage the system. As networks become more sophisticated they must offer facilities which allow for easy and effective control. A network manager facility should offer at least:

- monitoring of network activity
- collections of network statistics
- diagnostic tools for analysis of problems.

As well as offering easy access to

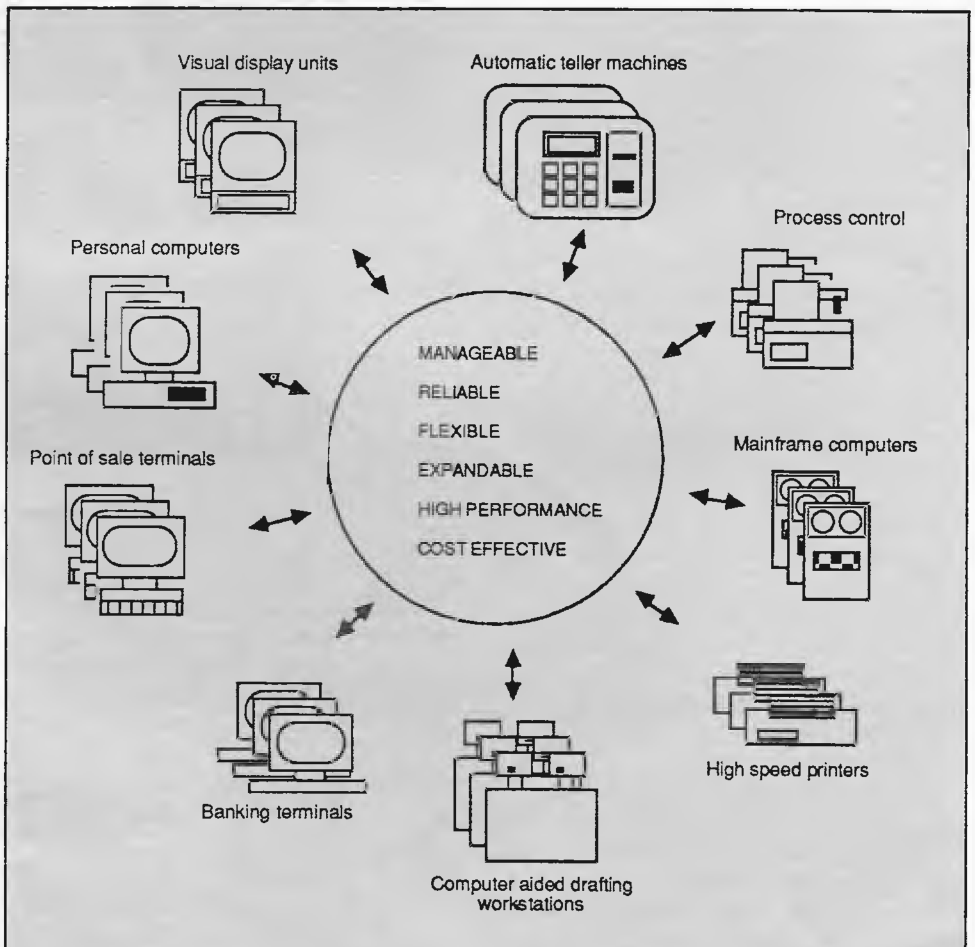

Fig 2: *Characteristics of a corporate network.*

Telecom move on X.400

(Continued from page 11)

Image transmission capability is envisaged by mid 1987 and the first prototype of compound documents — text and graphics/facsimile as per X.400 and Group IV fax standards — is expected by mid-1988.

Telecom regards it as "not unreasonable" to forecast TTX transmission of letters with logo, text, graphics as both fax-type and formula-generated, voice annotation and digitised signature by 1990.

"The definition of document has changed — and will change again in five to 10 years," said Schmidt.

Farm database on Csironet

CANBERRA — A database containing some 35,000 references about farm production and research has been launched on the Csiro's Australia online information retrieval system available on Csironet.

Csiro has teamed up with the Department of Primary Industry and the Australian Agricultural Council to make the vast body of reference work available.

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data network

authorised users, networks must also be able to provide security against unauthorised activity. Typical security services include:

- password checks
- data encryption on external links
- restricted access for certain resources
- automatic dialback for confirmation of origin.

The networking services discussed above are typically implemented as software modules, and in addition a networking architecture must also offer a range of hardware able to run the software.

Network nodes may be subjected to vastly different volumes of data. Economical networking demands a range of sizes in compatible equipment so the system can be tailored for maximum cost effectiveness. It is no longer acceptable for networks to require a separate black box for each network service.

Finally, a network needs physical links. There is a wide range of choices for the interconnection media:

☐ twisted wires
☐ coaxial cable
☐ optical fibre
☐ infrared line-of-sight link
☐ radio or microwave
☐ satellites

The links may be owned by the organisation or rented from public authorities or other companies. A modern network must be independent of the media used for the connections. Again this allows maximum freedom of choice, and means that existing links can be used if a new network is to replace an old system.

> *‘Modern corporate data nets must be independent of all host computers’*

The International Standards Organisation (ISO) has developed an Open Systems Interconnection (OSI) reference model which is becoming the accepted standard for network interconnections. Each of its seven layers has clearly defined functions to facilitate efficient interconnections. As the ISO protocols evolve they can be incorporated into the respective layers without major difficulties.

The executive software in a modern network should be based on this model, with well-defined interfaces between layers to allow a disciplined exchange of information.

In summary, a modern corporate data communications network must be independent of all host computers. It has to be a separate manageable entity providing all the services needed to allow various types and makes of computing resources to talk to each other.

It must be of high performance, cost effective and reliable, and preferably using a software architecture based on the OSI model.

● *Robert Rohrlach is general manager of Computer Protocol, which markets the Vendor Independent Networking Environment (CPvine).*

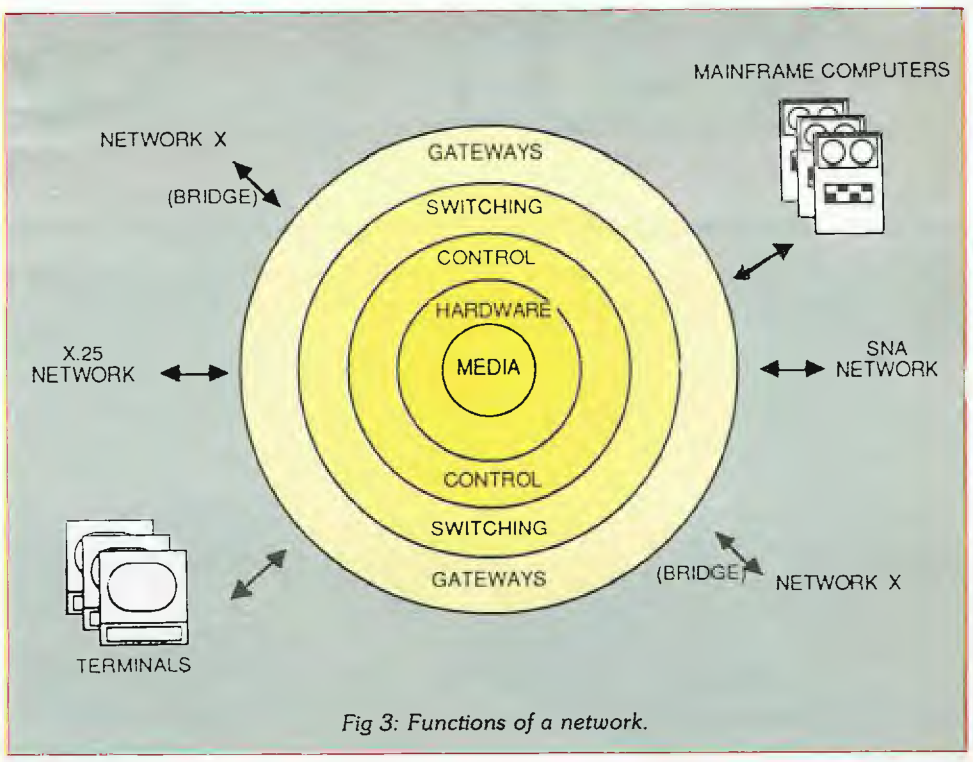


Fig 3: Functions of a network.

Teradata ‘in Focus’

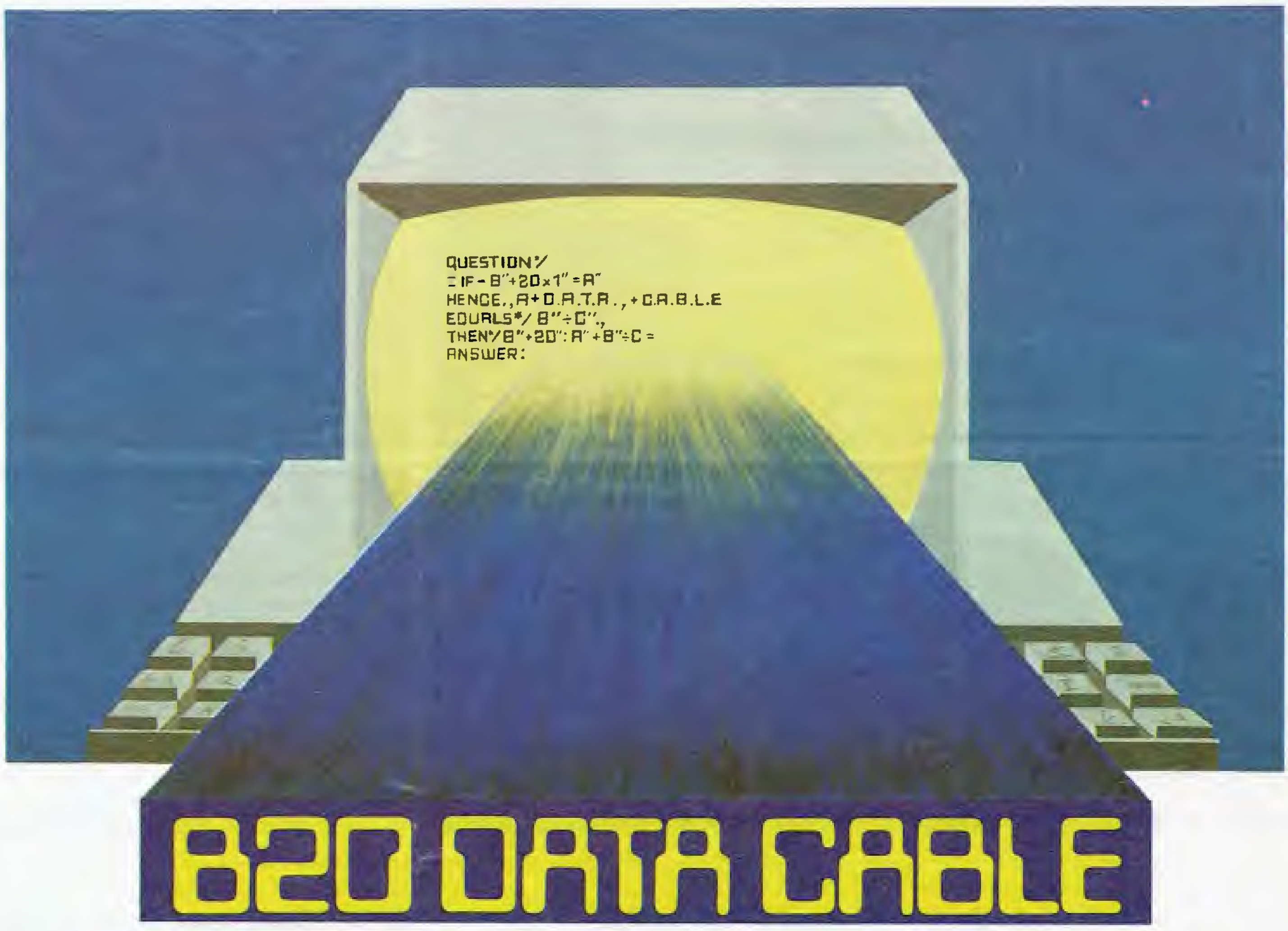
AN interface that allows Focus users to pass a request for data through an IBM mainframe to a Teradata relational database machine, speeding ad hoc queries against large Focus databases, has been announced by Information Builders.

The interface is said to work with Focus running under both MVS/ISO and VM/CMS and execute the standard Focus reporting and data analysis functions.

It will employ IBM's SQL to communicate with the Teradata DBC/1012 database machine.

Databases on the DBC/1012 can be tapped by Focus's relational Join operation and it permits up to 16 different tables to be linked.

Some of the databases that can be accessed on the mainframe include IBM's DB2, SQL/DS, DL/1 and IMS; Isam, Vsam and Qsam; Cullinet's IDMS; ADR's Datacom/DB; Software AG's Adabas and Focus files.



The equation maybe difficult, the answer is easy – Data Cables!!

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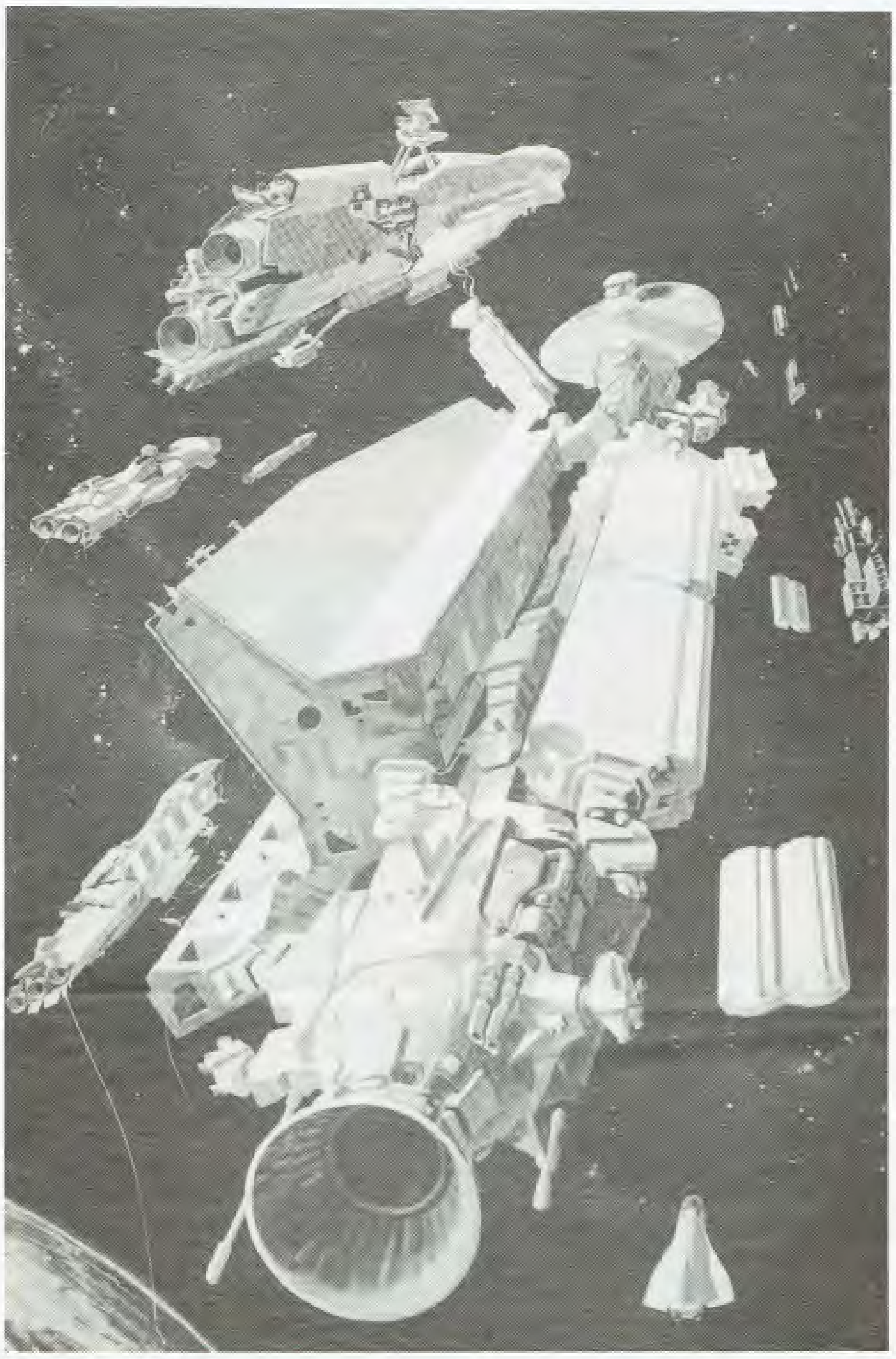
X.400 — key piece in the



Putting together an international messaging standard is akin to building a satellite in space with a multi-nation effort — but we are up to the application level already.

Joseph St Amand, a nine-year veteran of the communications industry's standards wars is chairman of the CCITT X.400 (electronic messaging standard) committee and senior network architecture consultant for Wang Laboratories of Lowell, Massachusetts. He recently shared his standards expertise in a discussion with Steve Moore, features editor of our US sister publication Network World.

How do you become so deeply involved in communications standards?
I have been at Wang for two years, representing Wang standards. Prior to this, I was at Interlan, where I worked with architectures, especially the lower part of the ISO Ethernet base. Before that I worked with strategic systems division, GTE Government Systems in Westborough, Massachusetts, dealing with large systems; Mitre Corp; and Bolt Beranek and Newman, where I was involved with the Advanced Research Project Agency network (Arpnet) routing algorithms and some ISO protocols. So I have been in this whole emerging field since the first version of X.25 came out in 1976. That was before the ISO and its open systems interconnect model, which is why X.25 has since been modified to conform with OSI.

Will widespread implementation of X.400 automatically mean that users will be able to interchange all types of documents freely?
No. X.400 is only a part of the solution, but it is a critical part. As X.400 is currently defined, it involves four protocols within the application layer of the OSI reference model. X.400 does not involve network management or directories, per se. For a complete solution, you need things like directory management and network management.

How are those functions handled within the OSI model?
You cross all seven layers. The usual picture of the OSI reference model is in error because they leave off this vertical slice along the side that covers all seven layers. It yields the network management, system management and layer management. The actual work on those functions is just now in progress, so X.400 by itself cannot handle that.

We need some means to encode and represent data. We need something like office document architecture and office document interchange format to begin to make the no into a yes. They are additional protocols that would reside within the application layer and enrich X.400, which will make use of them as they evolve.

If you were to assemble those standards into a complete message-handling model along the lines of IBM's Disoss, what would you include?
The components of Dioss are Dia/Dca (document interchange architecture/document content architecture) and Snads, (systems network architecture distribution systems). Those three components are in the application layer for the most part, plus some are in Layer 6, the presentation layer.

Snads, Dia and Dca are more or less equivalent to X.400, Oda (open document architecture), and Odif (open document interchange facility), respectively. They are not exact equivalents, just rough, functional equivalents. First you have the document content component that deals with how data is encoded, and then the document interchange component that deals with how you interchange data. Then, at the bottom of that, you have the means of transferring data.

X.400 must be augmented with rules governing how directories are used, and there will be a draft recommendation from the CCITT late this year. We have to define how message handling systems, that is, X.400 systems, make use of a distri-

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buted directory. That is some of the additional information that we must have to give X.400 full functionality.

How long will it take?

There will be a draft recommendation in the fourth quarter of this year that will deal with directory services. The networks management work is in its infancy in terms of standards.

Is certification likely to include Oda and Odif?

In time. There is a whole stack of protocols that vendors have agreed to implement according to fixed standards. The first certification will come next year, but Oda and Odif will come later.

In the meantime, are not users going to have to be careful about which system they choose in terms of how easy it is going to be to migrate to future standards?

Most certainly they should be careful, and one thing they can look for is certification. What protocols are in fact represented by this product? They should know that, and they should go to some entity that will certify the correctness of the protocol. Cos is one such entity.

But in the meantime, they have only X.400, one part of the triad. What can users do before the other two parts are fully specified?

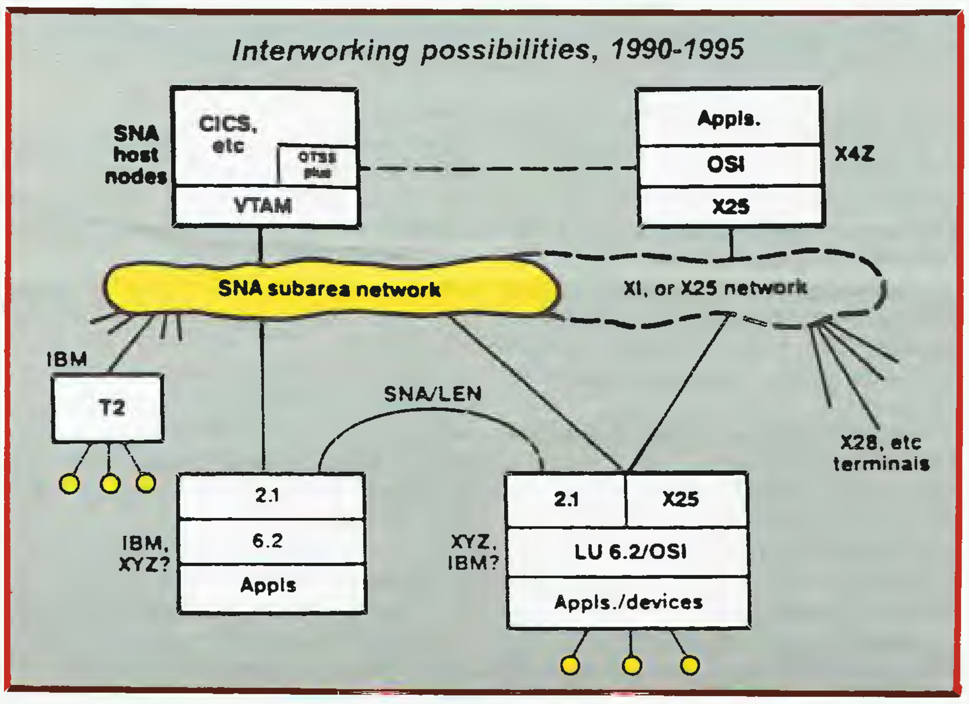
It simply means one cannot get the full functionality yet. One can nevertheless exchange documents correctly with X.400, even in the absence of Oda and Odif.

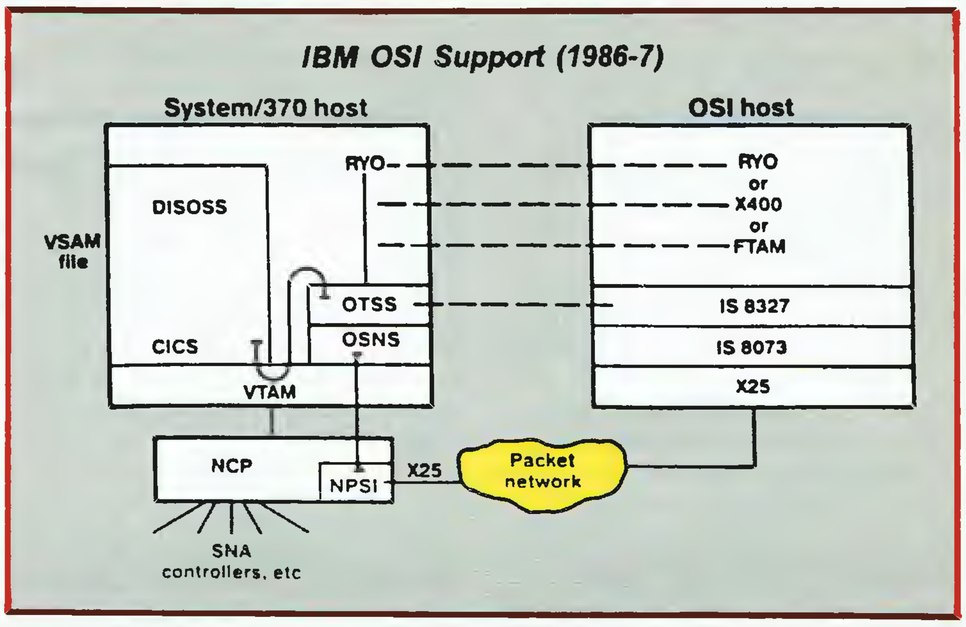
By supporting X.400, vendors are agreeing upon the minimal set of standards necessary to link proprietary solutions. X.400 is not intended to require vendors to go out and implement X.400 internally or change their user interfaces.

That is not necessary. So, given these so-called private domains, say Wang, Digital Equipment and IBM, X.400 describes a set of protocols and rules by which these different domains can be connected.

Is that done by mapping documents to an intermediate representation, or universal intermediate format, as is done by some third-party software vendors?

No. X.400 allows for a variety of encoding — a variety of interchanges. There are a number of encodings and document formats that can be used, and each vendor's domain will indicate that.





So X.400 is not mapping to a common format; it is mapping to a number of them. X.400 refers to a global distributed system that will cross the world, agreed to by communication's authorities and carriers and vendors.

Unlike any third-party software, this is an internationally agreed upon standard that will also apply in Japan, the USSR, Sweden and Finland. So in that sense there is no comparing X.400 to a third-party solution.

Once most vendors have agreed upon and implemented X.400 and perhaps Oda and Odif, is this third-party conversion market going to go away?

It might. For small vendors and small users it may not, but certainly there will be less of a need for such translations. Whether it goes away or not, I would not predict. But certainly the need for such translations would not exist.

How long will it be until the majority of vendors have adopted X.400? And how much longer after that will Oda and Odif be supported?

Vendors will begin to announce X.400 products next year. (St Amand was too cautious: DEC has since released X.400 products, as has a company called Sydney Ltd, which is marketing to OEMs in Europe — *Ed.*) How rapidly it is adopted, we can only guess at this time. Oda and Odif will reach the status of a draft international standard this year.

Once that happens, one can then begin to implement with some assurance that the technical details of the standard will remain fixed. How rapidly vendors are able to implement depends upon the vendor. I certainly expect to see some products in 1987.

As chairman of the CCITT X.400 committee, are you pleased with how rapidly vendors are moving to implement X.400?

Oh, extremely. No question about it; they are quite aggressive. Part of this group of vendors formed Cos, and they have a target to introduce this product in 1987.

Do you see any indication that IBM is going to come forth and support X.400?

X.400 requires at least a gateway to connect to other systems. It does not require that vendors change completely their internal way of doing things, so they can think of the minimum set required to connect different systems.

IBM is an active member of the (US) National Bureau of Standards X.400 special interest groups. IBM has for several years been working in Europe on the X.400 network, and IBM is currently developing an X.400 gateway to professional office systems.

Realistically, does it look as though most vendors will start with a gateway, rather than incorporate X.400 into their systems internally?

Initially that is what it has to be, because the other domains exist today. I suspect that as the various vendors look at the richness of X.400, they will see it as certain desirable features that may be absent in theirs, and they might find it good business

(Continued page 16)

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CORE REPORT/Standards

(Continued from page 15)

sense to adopt X.400 internally.

The work that I am participating in is to specify the details of protocols that must exist when you go between one private domain and another. That is all that one needs standardised. That is happening, and IBM is a part of those deliberations. So I think that, in time, IBM will certainly be a part of the world of X.400. IBM cannot ignore it. That is my prediction. When it occurs, of course, is only speculation.

What are the next steps beyond simply interchanging text documents? For integrated multimedia messaging systems, users may want to combine text, fascimile, graphics, binary data from spreadsheets, voice and even video.

X.400 has place holders for all those, for voice, video and so forth. That is, within the specifications there are means of indicating within a document that one portion of the document is graphics, the next portion is voice, the next portion is video, the next portion is text.

However, there are yet no internationally agreed upon standards for encoding that information. So, until that happens, while X.400 in theory can support that today, in reality it cannot, because the other things are needed. The other agreements do not exist yet.

What impact will future integrated multimedia messaging systems have on users?

The protocols only give one the capability to design products. The users will have to tell the vendors what they want in the product. I think that the market will drive what actually comes out.

The same thing is true of ISDN, which will simply allow for a capability for putting data on certain communications lines. But that does not define the product, and I expect in most companies the products that evolve will be based upon market requirements.

What is the relationship between X.400 and ISDN?

ISDN has nothing whatsoever to do with X.400. ISDN is primarily at the lower three layers of the OSI reference model, where it will just carry bits around. With X.400, we are talking about the seventh layer, the application. The real problems today are at the upper layer Oda and Odif issues.

What is next? In what order will standards be agreed upon for graphics, binary data, voice and video?

I would guess that video, graphics and binary data would come very soon. There are several graphics and binary data standard that are now reaching the stage of international and draft international standards. The same is not true for voice and video.

What effect will X.400 have on the electronic data interchange (EDI) market, where EDI service providers help companies exchange large volumes of purchase orders, invoices and other documents?

X.400 may obviate the need for such services, because once it is accepted, you will be able to put the very same device you use to prepare your internal documents into a different mode and then ship documents anywhere in the world. This is a business that I think will be adversely affected when a user can do the same thing from an existing workstation with nothing else required.

How do you answer the argument that standards stifle innovation in document-related software, and that the market is better served by companies that provide conversion services between idiosyncratic document handling systems?

It is not so much that X.400 would stifle innovation, but it would simply obviate the need for all of these translation schemes that exist today. And in that case it would be the ultimate stifling, would it not? You eliminate the need for all these conversions, which is exactly what the user wants.

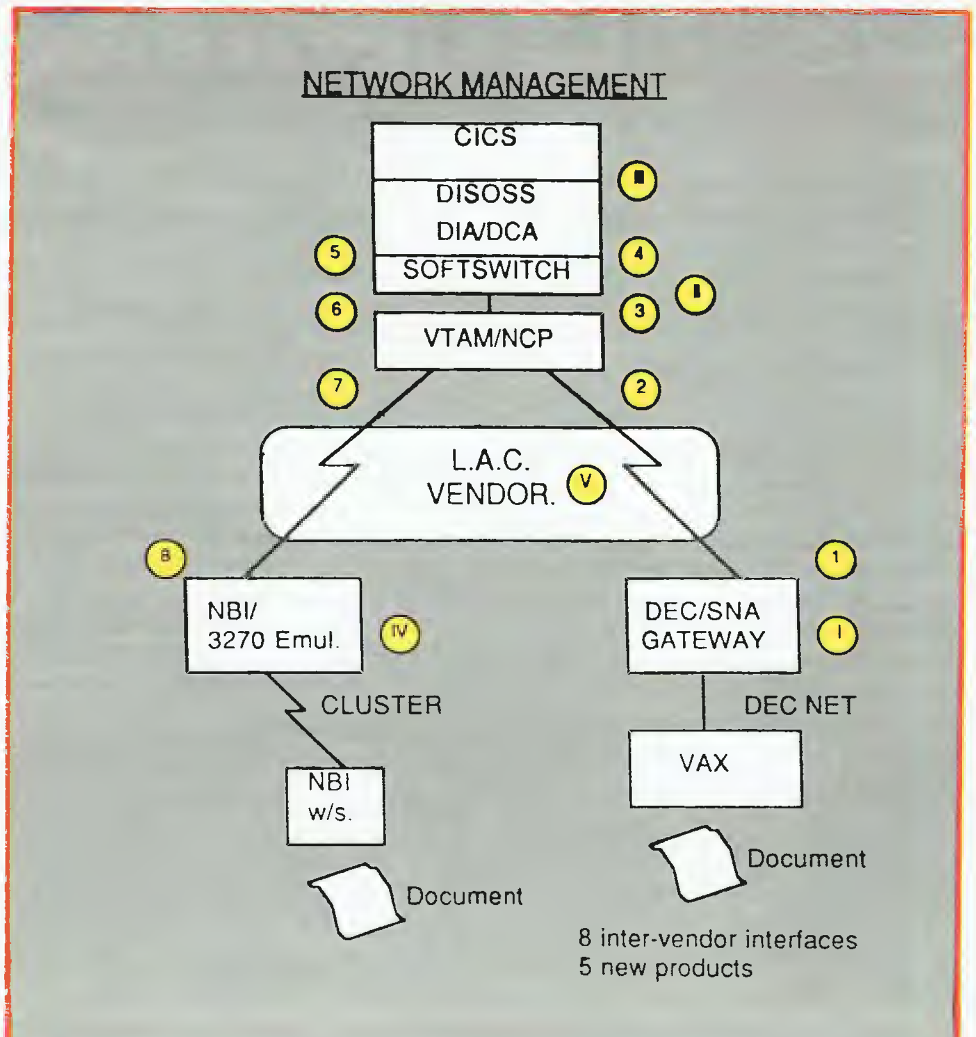
Why use some special means to do this if vendors have agreed that they will provide it?

Do you expect that vendors will bundle X.400 gateways in with their systems?

Again, that is a decision on how they are going to sell it. In addition to buying the vendor's proprietary systems, you may have to then buy X.400 software. Whether it is bundled into their system again is just a marketing decision. I daresay it would not come bundled into Wang's operating system.

Which word processing and electronic mail systems conform most closely to X.400 now?

From a user perspective, that is somewhat irrelevant, because it is not the intent of X.400 to have the vendors adopt it internally. So the fact that System A is more like X.400 than System B simply means that when System A engineers develop an X.400 gateway, they have an easier job.



Diagrams used to illustrate this article courtesy of Gartner Group/Compass Research.

But that is purely internal and seen only by the engineers within Company A. From the user's perspective, the fact that System B's internal architecture is less like X.400 then System A will have no impact. You can make a gateway to any system, and if your system is more like it, then your engineering job is easier. The user does not see the sweat that goes into building the software.

How does Ftam (file transfer, access and management) fit in?

Ftam is a means for file transfer, file access and file management. Within Ftam, there is something that is like the file transfer part of X.400, then there is much more. Ftam allows one to go inside a document to the record level and modify it interactively, whereas X.400 is a store-and-forward capability. So in this case we have a good reason for multiple standards.

Does IBM's LU 6.2 have any capabilities that overlap Ftam?

No. The whole notion of LU 6.2 deals with distributed interprocess communications. And Ftam is a means for individuals to develop documents, transfer documents, manage documents and access documents.

The user sees Ftam, but does not see LU 6.2. The user interacts directly with Ftam, while LU 6.2 is embedded within the details of the vendors' software. Ftam does something that X.400 does not do and that LU 6.2 does not do.

So that is a bona fide need for additional standards. Oda and Odif, for example, one needs. One needs virtual terminal, one needs the graphics metafile, one needs standards for videotex, teletext and telex. For voice they do not exist.

Ethernet's rocky road to OSI

By Elisabeth Horwitt

SOME USERS may find out the hard way that Ethernet and the Ethernet-like version of the Open Systems Interconnection (OSI) standard are not one and the same.

As the industry continues its slow, uneven progress toward full OSI implementation, companies with extensive networks based on older Ethernet protocols face a dilemma. They can delay their own conversion to OSI until the entire industry supports all seven layers — or they can gradually add OSI-compatible interfaces to their networks, with the understanding that these devices may not be able to communicate with products that conform to the older Ethernet Version 1 Protocols.

On the physical level, which determines how packets gain access to the network medium, the old Ethernet is close enough to the OSI 802.3 standard, vendors say. But as one gets into higher realms of data packet framing, routing and networking software protocols, incompatibilities between users' present networking protocols and the emerging standard become more and more difficult to reconcile.

GTE Corp, which uses Ethernet Version 1 to network a wide range of systems and vendors, faces just such a dilemma. "If we decide we need computer or peripheral devices that support OSI interfaces, we'll be in trouble," said Steven Leiden, a senior member of GTE's technical staff.

The company's biggest fear is of being forced to perform a wholesale OSI conversion of its installed base, which includes hundreds of workstations, mainframes and minicomputers.

"The biggest problem is internetworking between different vendors," argued Mark Calkins, a product manager at network vendor Ungermann-Bass. "Customers are not annoyed with us for not having OSI yet; they worry about how to communicate when they have both OSI and Ethernet on the same network."

Networking vendors agree that full migration to OSI is still a long way off. "Most carrier-sense multiple-access with collision detection local-area networks (Lans) will be based on the older Ethernet protocols for the next few years," said Rod Hodgeman, marketing manager for Digital Equipment Corp's networks and communications group.

Present networking hardware from DEC complies with the lower-level protocols of both Ethernet Version 1 and OSI. The next version of DEC's Vax operating system, VMS, to be released at an unspecified time, will also support both protocols, according to Hodgeman.

DEC, meanwhile, provides Vax OSI Transport Service, a software package announced last February which enables Vaxes to communicate using either protocol.

A number of independent network vendors, such as Bridge Communications and Ungermann-Bass, see their role as supporting old and new networking protocols in whatever combination the user chooses. The two vendors' Ethernet boards come in two versions, 802.3 and Ethernet Version 1, each running different and incompatible data link packet-framing protocols.

On top of that, users can choose between Transmission Control Protocol/Internet Protocol (TCP/IP) and Xerox Networking Services (XNS), two sets of networking protocols that are widely used in multivendor installations. The network vendors also promise to make OSI high-level protocols available as they are finalised.

But while the above products enable different types of networking devices to coexist on the same cable, communication only occurs between systems using like protocols, according to Judith Estrin, Bridge's vice-president of research and development.

This limitation is of no consequence when there are two user communities that never need to communicate. But it poses a problem when a company like GTE decides to instal OSI-compatible devices that need to communicate with an existing base of Ethernet Version 1 network interfaces, Leiden said.

GTE networks several hundred DEC VT200 terminals, Apple Macintoshes and IBM Personal Computers as well as DEC hosts, with bridge servers supporting the old Ethernet Version 1 data link protocols.

"Eventually all the vendors will go the OSI way, but right now it's too expensive to make the conversion," said Leiden. He hopes that by the time his company is ready to move to OSI, the existing bridge servers will be ready for replacement anyway.

The rise of diskless PCs

By Mary Petrosky

THE proliferation of local area networks, with their promise of shared resources, has started another phenomenon — the rise of low-cost diskless personal computers.

Digital Equipment Corp has already pulled the wraps off its diskless workstation models, in conjunction with the introduction of its local area Vaxcluster system.

At Comdex/Fall '86 show in Las Vegas, several vendors, including Santa Clara Systems, and terminal maker Kimtron, launched diskless personal computers designed for use on local area networks. NCR also released a diskless machine.

Other vendors rumored to have diskless personal computers in the wings include NCR, IBM and even 3Com. In addition, the number of local network vendors supporting diskless personal computers is growing.

The Santa Clara Systems unit, called the PC Terminal, is perhaps representative of the trend: It is a fully IBM PC-compatible diskless desktop workstation featuring a builtin network connection based on an Ethernet carrier-sense multiple-access with collision detection interface.

Based on an 8088 microprocessor, it offers 256K-bytes of standard internal memory, expandable to 640K-bytes. It has a 12in swivelling monochrome display and an internal monochrome CRT controller. It also includes an RS-232 serial interface, a parallel printer port and two expansion slots.

PC Terminal is said to be fully compatible with Novell's Netware operating system and comes with a proprietary network boot programmable in read-only memory, which allows PC terminals to autoboot Dos from the shared file server. PC Terminal was jointly designed by Santa Clara Systems and Novell for use with Novell's Netware operating system. It is being manufactured by Hyundai Electronics in its South Korea plant.

The terminal will be available during the first quarter of 1987.

One force behind the movement to diskless workstations is that it is more economical to share large disk drives than to outfit each user's personal computer with its own drive. Centralised backup of data is another advantage that comes from shared disk drives.

Also, local-area network versions of applications software generally cost less than the comparable number of individual copies of the program. The ease of updating a single network copy of particular package, rather than distributing diskettes to every user, is particulary appealing to large users.

Some observers even claim that diskless personal computers give back to MIS departments the control they lost when standalone personal computers mushroomed throughout their organisations. As the purchase and installation of networks becomes a corporate rather than a localised decision, diskless PCs are becoming more attractive because of their low cost.

Users still need some computers with disk drives on a network because they may want to run applications that are not available in network versions.

Tom Quinn, president of Santa Clara Systems, which was recently acquired by Novell, agreed that low cost is one of the key attractions of the diskless personal computer. His company unveiled a $US699 diskless PC that it developed in conjunction with Novell. As usual, technological advances have played some part in making the diskless personal computer viable.

> **'Network stations give back lost control to MIS departments'**

"The key to everybody jumping into the market is the remote boot Rom," according to a spokesman for Kimtron. Traditionally, personal computers have booted from a disk drive. Diskless personal computers need code in Rom to boot. Developing this code is not an easy task.

3Com's Bob Metcalfe prefers the term "network station" over diskless personal computer because many so-called diskless personal computers actually can accommodate a disk drive.

A network station is a computer that "when it was designed, was influenced by the fact it was going to be on a network," said Metcalfe, senior vice-president and general manager of 3Com's new product division.

In the personal computer market, Apple pioneered by building its Appletalk network interface into the Macintosh. Vendors of engineering workstations, including Sun Microsystems and Apollo Computer, have provided built in network connections for years.

3Com has supported diskless workstations on its Ethernet network since early in 1984. Last month it began delivering 3+Start, new software for supporting diskless personal computers.

Although several vendors cited security as a key reason users are interested in diskless personal computers, the lack of a disk drive will not prevent users from stealing corporate data. Users can copy data from their screens, dump it to a printer or find a system with a floppy disk drive to which they can download data.

Despite their advantages, no one expects diskless PCs to dominate the personal computer market any time soon. A number of software programs still use copy protection schemes that require the user to insert a key disk into a floppy drive to use the software. Many users also carry work home on floppies.

Perhaps the most difficult problem to counter is simple habit: PC users are comfortable with the independence their personal computers provide, and are reluctant to give that up.

- *Mary Petrosky writes for* Network World, *our US sister publication.*

Let the chips fall where they may . . .

By Luis Huesch

WHILE a horde of "power users" revels in the rush to market of IBM PC AT clones, companies with more foresight are listening to the distant roll of another Intel drummer, the 32-bit 80386 chip.

Computer industry leaders, including several software developers, told a recent user and vendor conference that they expect artificial intelligence applications, graphics and other such memory-intensive programs to be among the first to take full advantage of the processing power of the 80386 chip.

And advances in networking are as likely to bring changes in applications as in operating systems, according to Microsoft president Jon Shirley. "The 80386 allows development of low-cost, high-performance servers," he said.

Contradicting observers who predict that IBM's LU6.2 protocol will become the "industry standard" for networking, Shirley said IBM's Netbios will be standard, with a 80386 based micro the departmental server rather than a minicomputer. The same micro will take on the role of the gateway to corporate DP resources, Shirley predicted.

"Application software is going to have to change to live in an integrated office environment," Shirley said. "We'll need to see a tight integration of multiple applications, even from different vendors."

New operating systems will create a revolution in applications software, too. "I believe all corporate personal computers will be running totally new programs in three years," Shirley predicted.

Adrian King, Microsoft's director of operating systems product marketing, said: "What is happening with the operating system is we are recognising hardware is more sophisticated, more powerful, and we need to evolve the level of the operating system today."

The appearance of the first 80386-driven micro notwithstanding, it will take a while for such programming advances to filter through to the marketplace. "It takes several years to learn to use those advanced chips effectively," points out Ungerman-Bass chief executive Ralph Ungermann.

> **'Application software is going to have to change to live in an integrated environment . . . we'll need a tight integration of multiple applications, even from different vendors'**

Potential users are unfazed. Several companies now analysing their desk-based computing requirements for the remainder of the decade have already declared they will leapfrog the AT step in their upgrade path and go straight to an 80386 machine. And there should be plenty of choice: Intel says more than 150 companies are working on products using the chip.

Apart from early arrivals such as Compaq, what should the communications user be looking for? Digital Equipment has chosen the 80286 for its Vaxmate workstation that hangs off a Microvax II, and local DEC/spokemen say that it is at least very premature to speculate about a version containing the 80386 engine.

Since that chip will turn out to be something of a small mini-eater in its own right, it would perhaps have carried DEC's "conditional surrender" to Intel-based industry standards too far for that proud company to contemplate using it now. Well, let the chips fall where they may.

However, in the communications market at least one company, Corvus Systems, is shipping an 80386-based network server/workstation for which it earlier bought complete Intel evaluation-type motherboards. The file server carries a price tag of between $US13,000 and $US17,000, depending on the configuration.

The company is enthusiastic about what it regards as a "mainframe on a chip, with lots of characteristics of (IBM) 370 mainframes". Demand paging and virtual machine capability make it possible for the chip to emulate earlier Intel CPUs, and its processing power puts it in the league of the IBM S/3X series of minis.

Corvus has forged links with two Californian developers of operating systems, Softguard and the Santa Cruz Operation, to exploit the chance of "defining the market for new technologies," according to a spokesman.

In effect, there has been speculation that when IBM comes out with its own 80386 machine sometime next year, it will use a proprietary VM-type operating system. With such a strategy it could tie the new system more closely into its own architecture.

IBM watchers expect the company to use so-called application-specific integrated circuit chips from Intel with which it has just struck a manufacturing accord for them for mainframe communications protocols, networking and multitasking. Special I/O (input/output) "hooks" would be included in the operating system to make use of such special chips, and the combination would make for a technical and legal minefield that would take clone makers a long time to clear.

Since the 80386 can emulate earlier generations of Intel chips, it would make sense to have an operating system that makes use of this feature. That is exactly what Software Link of Atlanta is shooting for: The Atlanta-based maker of the Multilink "network on a disk" program says it is developing a multitasking, multi-user 80386 operating system that is a superset of MS-Dos.

Called PC-Multilink Operating System/386 (PC-Mos/386), it is to remain fully compatible with MS-Dos and is expected to be delivered in February with a $US600 price tag.

PC-Mos/386 is to support between 18 and 27 concurrent users, depending on the actual speed of the host, and to use all existing MS-Dos function calls as well as its data structures for disk space allocation and formatting.

Existing and future MS-Dos applications are therefore said to run unchanged, while additional commands in PC-Mos/386 will let users change tasks and priorities among applications, for instance. Record and file-locking, intertask communication through the IBM Netbios protocol, usage statistics, nested batch files, print spooling and security are other enhancements.

The company claims to be the only vendor developing a true operating system specifically for the 80386 chip, arguing that host environments being offered by such developers as Locus Computing and Softguard will add extra overhead to the chip's operation and still require separate operating systems.

Locus' product runs multiple MS-Dos sessions under Unix, while Softguard's VM/386 creates several "virtual machines" which can each run a different application under MS-Dos or Unix. Softguard is using Corvus 80386-based workstations to develop VM/386, as does Santa Cruz Operation for developing the 80386 version of its Xenix System V.

Other 80386-based hardware on the horizon, such as Advanced Logic Research's Access 386 will use MS-Dos 3.2 rather than any more "exotic" operating system.

Progress slow on plant floor

By Bob Wallace

DETROIT — The Autofact conference, long considered the domain of machine tool and factory automation gear vendors, is undergoing a metamorphosis. A sign of the changing Autofact landscape was that office networking giant Digital Equipment Corp, regional Bell operating company Ameritech and several fibre-optic local-area networking vendors infiltrated the ranks of the manufacturing moguls at the Autofact'86 show here.

While DEC used the show as a platform to launch Manufacturing Automation Protocol-compatible networking products, Ameritech, Fibercom, Artel Communications and Codenoll Technology attended the Motor City manufacturing meeting with the aim of persuading factory networkers to adopt alternative communications strategies.

Devices hooked to the factory net communicated with equipment at remote locations using Ameritech's data-over-voice and high-speed digital communications services. Services were provided across the regional company's packet-switched network.

Meanwhile *Computerworld's* Elisabeth Horwitt reports that the expected wait of at least one year for Version 3.0 of the Manufacturing Automation Protocol (Map) dramatically limited related customer interest and vendor product announcements during Autofact'86.

Two vendors made Map-related announcements during the show. DEC announced the Vax DEC/Map, which implements Map 2.1 protocols on all Vax Unibus and Vaxbi bus computers under the VMS operating system.

The Map implementation includes all seven layers of the OSI protocol, including the following application interfaces: Common Application Service Elements (Case), which provides peer-to-peer, program-to-program communications; Manufacturing Messaging Format Standard (MMFS) protocols for communications with controllers and robots; and File Transfer Access and Management (Ftam), which establishes virtual program-to-program circuits for file transfer.

DEC also announced Map Control Program and Directory Services/Client Services Agent network management tools that do not yet exist as Map specifications. DEC hopes that the protocols "will become the de facto standard".

Industry Insight

WASHINGTON, — The US Federal Communications Commission may use its authority over equipment procurement practices of Bell operating companies to bar Siemens AG of West Germany from the US telecommunications market.

FCC chairman Mark Fowler said recently that his agency would begin a rulemaking on BOC procurement practices as a way of determining what authority the FCC has over foreign equipment manufacturers doing business in the US.

While Fowler said the proposed rulemaking is not an attempt to bar any foreign company from doing business in the US, observers see the move as retaliation against Siemens. The West Germany government is backing Siemens in its bid to buy a key French switch maker courted by AT&T as a point of entry into the European market.

* * *

THE SOURCE is looking for a partner or straight-out buyer after the Readers Digest telecommunications venture turned its first profit ever. The company is said to have made a $US13 million profit in its last financial year.

The Source-model for a number of similar ventures, including Australia's thrice-resurrected Teledata is "looking for a business partner who can help us boost our business presence," according to president Jay Keller.

Parent Readers Digest, which holds some 80 per cent of the information utility, has little experience in selling to business and is reportedly looking at ties with business information experts such as Reuters, Dun & Bradstreet and Knight-Ridder.

* * *

THE US got its first real-world taste of the Integrated Services Digital Network (ISDN), at the end of November when regional Bell operator Mountain Bell, Northern Telecom and NCR engaged in a joint ISDN trial over the public telecommunications network in Phoenix, Arizona. The test involved a five-minute simultaneous voice and data call from the Phoenix Civic Plaza through a Northern Telecom DMS-100 ISDN switch to a recipient 4km away.

* * *

AT&T of the US and Nordic Cable and Wire Works (NKT) of Denmark have formed a joint venture company to manufacture optical fibre. The new company, to be registered in Denmark. will take over NKT's fibre manufacturing plant in Broendby, outside Copenhagen. AT&T will own 51 per cent of the venture, with 49 per cent held by NKT. AT&T's participation is expected to triple the current production capacity of the NKT facility.

* * *

AAP Reuters Communications and STC have announced integration of the Aspen voice messaging system with the STC's Starswitch, the first such integration in AAP's campaign of incorporating voice mail with locally available PABXs. STC business system division manager Russell Scrimshaw believes the integration serves to position Starswitch as "a fully-featured product in the corporate market". In particular the integrated product is aimed at the hotel industry, where STC is already said to have a strong base and for which Aspen vendor Octel Corporation has produced a specific guest messaging software package.

* * *

RETAILER Coles Myer Ltd expects "significant savings in operating costs, software and host processing overheads" from its new Melbourne-Sydney direct link for IBM channel-attached devices, including twin laser printers.

The company is one of the first users of the Paradyne Pixnet XL communications system — which extends the block or byte multiplexer channel of IBM mainframes to connect highspeed devices to any CPU or application on a network — to support remote Storage Technology 6100 laser printers. Techway, which supplies the Paradyne product, said support has since been introduced also for the IBM 3800 laser printer.

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Netcomm launches 3 sync units

NETCOMM has released three 9.6K-bit/sec intelligent synchronous modems aimed at high-volume corporate users with networked mainframes and minis. The 9648 Smartmodems are claimed to conform to CCITT V.29 and V.27 recommendations and to have novel auto-dialling capabilities.

Two versions, designated 9648FT (fast train) and 94648DP (data pump), are said to support full duplex transmissions over four-wire leased lines at 4200, 7600 and 9600-bits/sec, or over two-wire dialup lines using auto-dialling. A low-end version, the 9648HD, communicates at similar speeds over two-wire leased lines or the PSTN using half-duplex transmission.

The new products fill a gap in the Netcomm range between the 2400-bits/sec over the dialup network.

Netcomm said the 9648FT and DP models are fully compatible with the Telecom/Datacraft 5096, including a constellation generator and remote loop testing, with the FT model boasting 22ms retrain in half-duplex PSTN applications — five times faster than the Telecom product.

Mux merges coax lines

CORVUS Systems has introduced a local area networking hub which it said can use existing twisted pair cabling. Developed jointly with Cornell University, the hub converts the Omninet's bus topology into a star-type network with twisted-pair serving as the trunk cabling system.

To link stations to the network, enhanced Omninet cabling (OCS II) can be used at speeds of up to 4M-bits/sec.

Lan hub runs twisted pair

SHUTTLE Datacommunications has released the Canadian Muxlab range of coax connectors and coax-to-twisted pair converters said to permit low-cost cabling solutions in the IBM 3270 environment.

The Muxlab family ranges from the Biplex device that "multiplexes" two coax lines from a 3274 on to one coax cable which in turn is "demultiplexed" by another Biplex on to two coax terminal connections.

The series goes up to the Megaplex, which provides up to 32 coax connections to the 3274 and up to 16 twisted-pair links to a second Megaplex to achieve a 32-coax fan-out to 3178-type terminals. According to Shuttle Datacomm, there are no changes necessary to either existing hardware or software installations.

Decnet link

MICOM Systems has introduced a controller that links a PC to DEC's Decnet. The Micom-Interlan N15010 data link controller supports data rates of up to 10M-bits/sec, requires Decnet-Dos software and comes in two versions: an onboard transceiver for thin-cable Ethernet and a transceiver interface connecting to an external transceiver by way of 802.3 cables. Micom is represented in Australia by Datacraft.

Market niche seen for local network modems

By Noel Bennett

J N ALMGREN Pty Ltd has built on expertise gained from developing its own modems for EFT/POS networks to introduce a range of standard modems for larger network users.

The company has also begun marketing a Canadian-sourced X.25-based network tool for IBM Personal Computers and compatibles.

The new modems comprise the high-density-traffic AS474 for the central communications room and the AS472 for outside terminal use. The AS478 network controller has also been developed to provide network management facilities for these products.

A spokesman said the new devices were designed to fill a market niche where large network users with multiple modems, such as bureaus, required high reliability, high-density packing to minimise central space requirements, and the ability to recognise unacceptable line noise levels and so avoid unnecessary Telecom charges.

He said Almgren had used the latest digital signal processing methods in the design of the modems, which, among other features, allowed a racked AS474 system, controlling up to 64 AS472 modems, to occupy less space than a three-door filing cabinet. Power supplies were also accommodated in this space.

Claims are that this modem allows any combination of synchronous, asynchronous, auto-answer (switched network), leased line (two and four-wire) and speeds from 300 to 2400 bits/sec to be handled in a single frame. CCITT standards supported are V.21, V.23, V.22 and V.22 Bis. The spokesman said it was intended to cater for higher speeds in the future.

The AS472 V22/ V22.Bis auto-answer modem is designed to work on two-wire switched or leased lines. As well as automatic retrain on poor signal lines, it also features analogue and remote digital loops for testing.

Access X.25, which Almgren now distributes from Eicon Technology, Canada, is said to allow any IBM PC or compatible on a Netbios-compatible Lan to communicate over various X.25 networks with large hosts, other PCs supporting the Access/X.25 program, other PCs on the Netbios compatible Lan, and non-intelligent Ascii terminals.

In conjunction with Eicon's Network Adapter and the X.25 network interface, Access/X.25 provides synchronous communication over either switched or permanent virtual circuits.

The Network Adapter itself is said to be able to maintain up to 32 dynamically allocated virtual circuits.

Gateway bridge cuts out need for dedicated line

GATEWAY Communications has announced an enhancement to its networking software said to allow remote personal computers access to an IBM SNA (systems network architecture) environment through X.25 packet-switching networks.

The enhancement, dubbed a "gateway bridge," links two of the vendor's existing gateway products, the G/SNAnet and G/25Net, both designed to work with Gateway's GNet series PC local area network offerings.

With the gateway bridge, available now at no extra cost, users on a local Lan are said to be able to access a remote mainframe, using G/25Net software and controller on one of the local Lan nodes as well as on the remote Lan, with the two Lans communicating via an X.25 network.

Once connection has been established, the local Lan gains access to the G/SNAnet software on the remote Lan, which communicates directly with the mainframe host. The interface enhancement, built into the two GNet modules on the remote controller, then establishes the host connection.

Before the availability of this bridge, a user would have required a dedicated line to access the remote mainframe. Gateway Communications' GNet is handled in Australia by Data Peripherals of Sydney.

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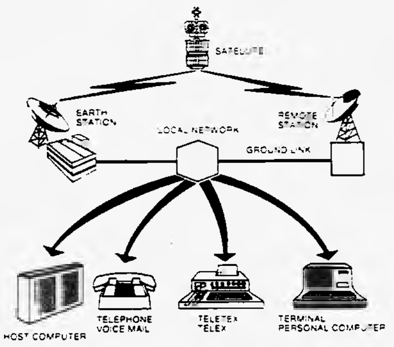

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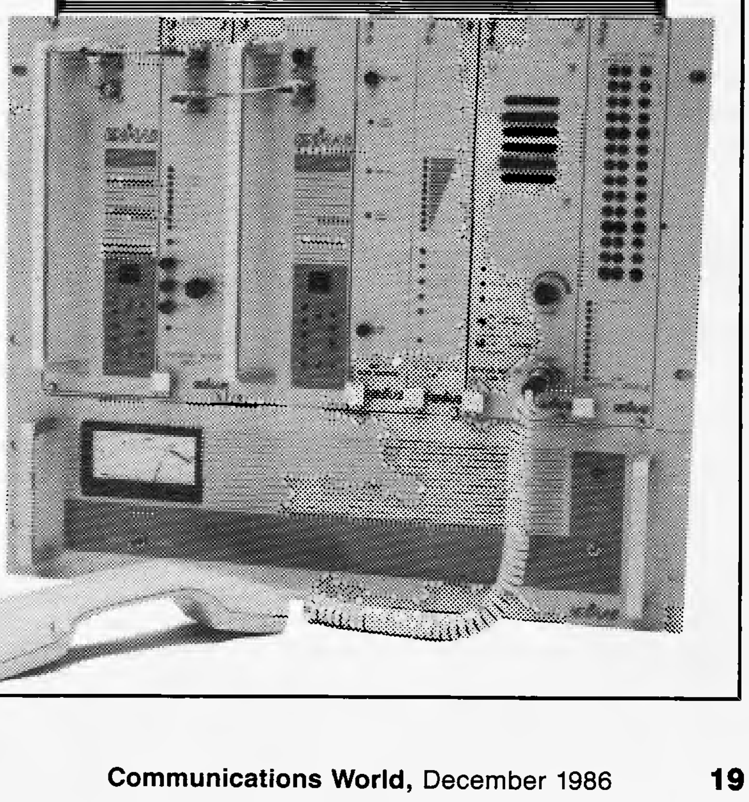


Parity predicts gateway boom

IBM's Systems Network Architecture has been described as a moving target by more than one of the hordes of vendors who have to adapt products to SNA's evolving interfaces.

But that has not prevented enterprising companies from offering SNA links down to the PC addon board level.

Digital Communications Associates (DCA), for instance, is thought to have roughly half of the total 3270 board market, which IDC estimates will soar from 250,000 units sold this year to 420,000 in 1990.

Lan gateways and other types of IBM emulation will grow even faster, according to IDC.

An interesting twist has been given to the emulation story recently by US comms board vendor Trisystems, which came up with a card trick that provides 5250 or 3270 connections to both X.25 and/or SNA environments. In addition it will also deal with BSCC — so the cards should be eminently useful to corporations with a hodge-podge of systems.

According to Parity chief Parry Thomas, such gateway products offer the best of both worlds — Lan links and direct host connections — to the increasingly powerful enduser workstation.

He, too believes that Lan and gateway products will boom, and forecasts corporations will make large investments in the office automation area next year. This is because an estimated 52 per cent of all information accesses occur within the one department, while 17 per cent cross departmental borders.

That means more than two-thirds of all required information is not available on the user's own desk. Yet 72 per cent must be available on demand, and this figure is estimated to grow between 50 and 90 per cent each year.

Since the user did not care where the needed information resided as long as it was available on demand, tying Lans and minis or mainframes together via gateways made a lot of sense, said Thomas.

He was speaking at a recent Parity presentation to the computer press introducing the new boards, which his company packages as part of its corporate communications solutions built on IBM PCs and System Z36 minis. In 1986 about half of all PCs sold in the US had some communications capacity. By 1959 this figure should reach 70 per cent.

Only IBM had a clear direction and strategy that took into account the increasing power at the desktop and its communication needs, said Thomas, referring to briefings he had been given at Boca Raton.

While closing off its PC architecture via the systems software, IBM was developing a strategy for compound electronic documents containing voice, data, text, images and graphics and was moving toward a virtual machine environment.

This added up to "total communications transparency — everything is *logically* on the user's desk," said Thomas. Parity, he said, was therefore strongly betting on workstation-to-host communications.

Systems engineer Adam Forsyth cited the advantages of gateways as:

- Flexibility. All PCs on the Lan can be connected through the one dedicated gateway PC.
- Cost savings compared to using cluster controllers or multiple PC cards.
- Security. The access protection of the Lan is complemented by the even tighter security available for host access.
- Integration with host applications for electronic mail, and so on. But "full document integration is still a long way off".

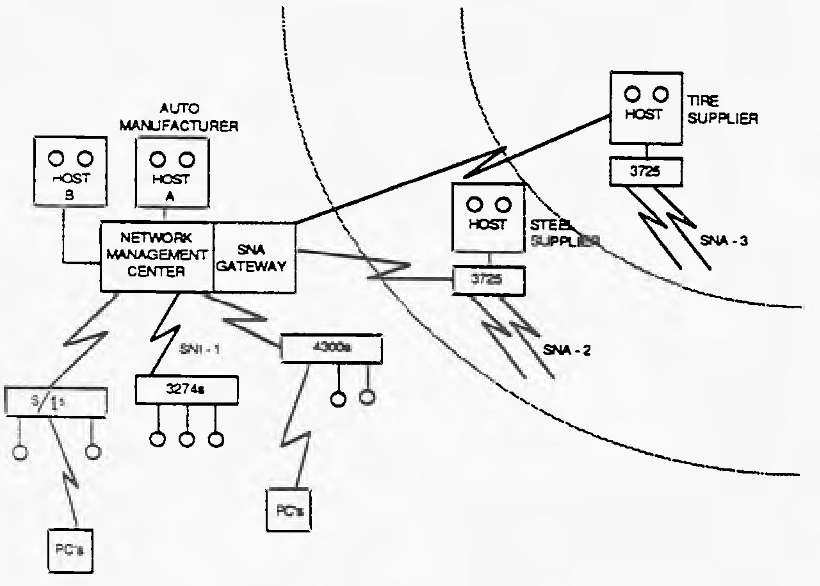
Forsyth said the Trisystems TC-5250 Remote was the only product that worked both in the SNA and X.25 modes. The TC-5250 Gateway, which looks to the host via synchronous modems or modem eliminator and emulates an IBM controller with attached devices (3274/76, SNA/BSC). Again, up to 32 logical units (LU) can be maintained per physical unit (PU). The terminal/printer emulations are 3278/9 and 3287, respectively.

Pre-announced for January availability was the Access 36 5251-11 advanced cluster system, consisting of a 5251 emulation board powered by a 68000 CPU, with windows into seven LU sessions and a half size communications board with cluster software.

The product is claimed to get around the slow response times usually experienced with serially connected PCs: it is said to accommodate up to five PX, XT, ATs and two printers without response time degradation. Emulations are: 5251-11, 5291 and 5292 displays and 5256, 5225 and 5219 printers.

— **Luis Huesch**

Intercompany Networking with SNA Interconnect



- Resolves ambiguity in network addressing
- Supports multiple concurrent sessions between any pair of interconnected nodes
- Permits same LU names in different, connected SNA nets

US company sets up shop in Sydney

NETWORKS come in many flavors, and range in communications speeds from M-bit/sec to the leisurely pace of the "sneakernet", which has the user download a file on to a floppy and walk across to the next machine on the office "network".

If the file is voluminous or needs the program as well to run, this approach will not work, of course. Ideassociates, a US add-on comms boards specialist now represented in Australia, has a way out of the impasse: 10M-byte (soon 20M-byte) of removable Winchester disks. With the controller, 4in hard disk cartridge, cable and a hard disk cleaning pad (the price of comfort is eternal maintenance), the drive costs around $A3300.

Ideassociates will also part with a neat twin-drive assembly for around $A7000. Encryption is $A100 extra, in case you tend to leave your 10M-bytes of company accounts in the pub.

More to the point, Ideassociates offers a range of PC to IBM System 34/6/8 communications boards, a 3287 mainframe printer sharing card that can also be used for 327X terminal emulation, 5250-type resource sharing by four PCs with only one emulator board, and a range of all-aboard cards boasting numerous ports and up to 16M-bytes of memory.

Wireless Lan arrives

THE US Federal Communications Commission (FCC) has recently thrown out an application for setting up a wireless wide-area network, but its rejection on the grounds of the frequency requested left open the way for a comeback.

Another contender, however, has chosen a different approach that it expects will make FCC licensing unnecessary. Sterling Networks of Baltimore said the $US400 Freenet transceiver and software it is developing for small-to-medium size offices will use a proprietary radio frequency technology with a small bandwidth and transmission speeds of 9.6-19.2K-bits/sec.

To reach the market in the first quarter of 1987, Freenet will support up to 32 users and is reported to span up to 23,225sq m of floor space. Because it sends only small bits of information at any given time — compared with the 1-10M-bits/sec throughput on hardwired Lans — Freenet is claimed not to interfere with other radio spectrum transmissions and will therefore be exempt from the usual restricted-area licence requirements.

The transceiver is smaller than a stand-alone modem and plugs into the computer's RS-232C port. Self-installing multitasking software includes electronic mail capability.

Smartport card turns the PC into a Xenix engine

ARNET Corp of Nashville, Tennessee, offers an intelligent communications board based on the 80186 CPU that turns an IBM PC or workalike into a Xenix multiuser system. The Smartboard comes in four or eight serial port versions which retail for $US895 and $US1295, respectively.

The board's 64K-bytes of dual-ported memory allow data to be accessed by either the PC's CPU or the Smartboard's processor. Because the 80186 takes over the job of driving terminals and other peripherals, there is not the response time degradation usually associated with adding extra terminals.

"With Smartport, a user can go from four or five users on a 286-based system to eight or 10 and maintain the same performance," the company claims. The board is also said to be compatible with 80386-based machines, giving users an upgrade into minicomputer performance regions.

NCR pushes diskless net workstation

DISKLESS workstations destined to be used on networks are becoming all the rage. One of the latest newcomers on this pitch is NCR, which sold 10,000 of its $US1700 AT-compatible NCR 3390 to stockbrokers E F Hutton as soon as they were announced.

The company says the 3390 is intended for a communications-oriented work environment. At E F Hutton, it will replace Bunker Ramo terminals on executive desks for online stock market queries via satellite network in that company's $US20 million Advanced Workstation Executive automation project.

Because of its two-board architecture with a separate 80286 processor board, there is speculation that NCR will offer an 80386 upgrade later. The 3390 can be fitted with 3½in disks or a hard disk, supports EGA color graphics and can take two IBM PC XT-compatible expansion boards.

Excelan woos IBM RTs

LAN maker Excelan, betting on coming upgrades for IBM's RT workstation, has launched a $US1295 hardware and software package that will connect the RT to DEC Vaxes or Sun workstations on an Ethernet network. The Exos 8016-01 software, developed jointly with Interactive Systems which wrote the Aix Unix-like operating system for the RT, includes file transfer and other utilities, plus programming tools that let developers build user interfaces that look like the interface of the attached host. The protocol used with Excelan's Intelligent Ethernet Controller Boards is TCP/IP (Transmission Control Protocol/Internet Protocol).

Soft Spots

NETWORK Innovations has added direct support for Ashton-Tate's dBase III Plus, Framework, and Multimate to its Multiplex networking software for DEC Vax-based databases. With Multiplex, a PC user can link into a Vax, browse the database in rows and columns onscreen, and download selected data directly into a file of one of the supported programs. Multiplex costs $US1195 to $US11,000, depending on the host configuration.

* * *

BANYAN Systems has improved file access speed, added network management features and included support for high-speed modems in a new release of its Vines network operating system.

Release 2.0 also offers options such as operation over X.25 packet-switching data networks and 3270 emulation. The upgrade costs $US995 per server, but customers with service contracts will receive it free.

The new 3270/BC option enables a Banyan server to emulate an IBM 3274 controller without the need for an emulation board.

A version supporting 32 simultaneous sessions is $US2995, the 64-user version is $US2995. The X.25 option, at $US3495, includes the software and a hardware adapter.

* * *

PROTEON has announced two network management tools for use with its 10M bits/sec Pronet-10 local area network. The $US1200 Token Ring Monitor includes a board and software for tracking demand on the network, identifying problems and enhancing security. The $US4900 Token Ring Analyser package of three boards adds the ability to track network frequency changes and the time it takes for the token to circulate through the network.

* * *

UP TO seven concurrent IBM minicomputer sessions can be distributed across a local area network with the Asher Minilink Gateway software and PC add-on board, according to Asher Technologies of Roswell, Georgia. The $US2290 package, based on the 32-bit Motorola 68000 processor, lets users on a network communicate with a System /34, /36, or /38 mini.

* * *

AUTOMATED Message Desk, a software package custom-tailored for hotels and motels, is an enhancement to Octel Corp's Aspen voice messaging system. It is said to provide a cost-effective, personalised message service for guests.

With the package hotel operators can assign a private voice mailbox for each guest, where callers can leave detailed voice messages that guests retrieve at their leisure, either from within the hotel or outside. Visible and audible indicators in hotel rooms signal when messages are waiting. Built-in system prompts guide both callers and guests when leaving or collecting messages.

The Aspen system with Automated Message Desk can serve hotels and motels with 50 to 3000 rooms.

* * *

COMPUTER Protocol has announced a SNA gateway for non-IBM computers and terminals, including hand-held, point-of-sale and financial terminals. The CPSNA 3270 can serve as a cluster controller for up to 32 terminals connected either directly or by modem, as a SNA gateway to a wide area network, and as a gateway to a local area network.

In the latter application it has already been implemented with Applitek's Unilan, creating a fully compatible Lan/Wan with an SNA network interface, the vendor said. Prices range from $A6000 to $A30,000, according to the number of ports.

Tandem bets on Netbios

By Mary Petrosky

TANDEM Computers will tie its fault-tolerant systems to a wide range of local area networks by supporting IBM's Network Basic I/O System (Netbios) — a strategy that contrasts with the approach taken by most minicomputer vendors, which support only specific networks.

In addition to offering users flexibility in the selection of local networks, Tandem's Netbios support will allow the company to market its online systems as fault-tolerant file servers. This could put Tandem squarely in competition with local net vendors such as Novell.

Tandem is implementing its strategy through Multilan, a series of hardware and software products that allow Tandem's on line transaction-processing systems to connect to local area networks that support Netbios protocols. Netbios defines communications between a network interface card and the PC-Dos operating system.

In a related announcement, Tandem introduced Wordline, a collection of software products that support IBM's Document Content Architecture and enable document exchange among dedicated word processing systems and PC-based word processing packages.

Tandem has licensed document translation technology from Soft-Switch and will incorporate it in its own Transfer and PS Mail programs.

By supporting Netbios, Tandem is allowing users to implement the local network they want, said Chris Erickson, director of software product management. Multilan reportedly supports IBM's Token-Ring network and PC Network, Ungermann-Bass' Net/One, Sytek's System 6000, and other local nets that have adopted the Netbios interface.

Multilan also allows Tandem systems to act as fault-tolerant file servers for local network users, extending Tandem system capabilities to personal computers, Erickson said.

Tandem is to introduce a line of low-end systems next year, and could find itself competing with Novell, which already offers fault-tolerant file servers.

Multilan hardware consists of a $US4000 dual-port controller that resides in the Tandem system, a $US4000 attachment device that resembles a personal computer and provides the connection to the local net and a 10M-bit/sec link between the two devices.

Multilan software includes file and printer server software, emulation software for Tandem's 6530 terminal family, and a Netbios application interface that can be used to develop co-operative processing applications.

Multilan pricing depends on the Tandem system used.

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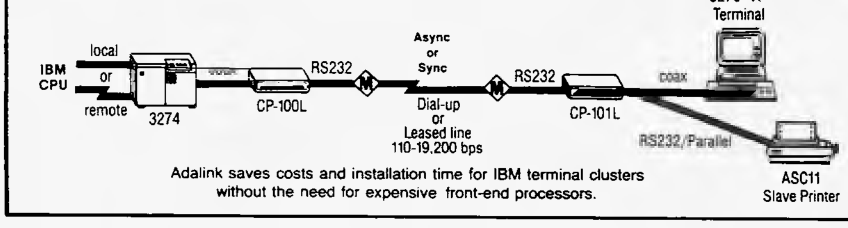

Adalink saves costs and installation time for IBM terminal clusters without the need for expensive front-end processors.

Citibank keeps in step with technology

By Noel Bennett

CITIBANK Australia's operating philosophy is very simple. Service is of paramount importance, money and information are interchangeable, and telecommunication networks make these objectives and basic tenets possible.

Stephen Kendall, executive manager, telecommunication, Citibank Ltd, said of network and attached devices: "The bank is very committed to technology and goes to great lengths to ensure we are on top of developments so as to cater for all our customers' needs."

Since large corporate customers require Citibank services world wide, and as Citibank operates globally, the bank is linked by a huge international and integrated network supporting some 13,000 to 14,000 users.

Stephen Kendall . . . hungry for information about advances in technology.

Citibank Ltd, the Australian offshoot of Citibank N.A. (US), the world's largest commercial bank, operates through three divisions: the institutional bank, the investment bank and the individual (retail) bank.

The institutional bank handles the bank's corporate customers, and Kendall looks after its telecommunications requirements.

The investment bank operates in financial markets and shares the same interstate networks as Citibank's institutional division Kendall's staff act as consultants to this bank.

The individual bank, providing retail banking services, is "self-contained" in telecommunications expertise and runs its own Australian network while sharing, to a minor degree, the bank's international links.

These banks each have their own data processing facilities and accompanying support staff: the institutional bank has two IBM 43XXs, running under Dos, but being converted to MVS; the investment bank has Prime superminicomputers; and the individual bank has an IBM System/38 and a Burroughs A/9 mainframe.

Kendall, who began his computing career working on a General Electric (UK) System 4 mainframe in Canberra in 1971, said customers receive a far better service with each bank having its own data processing establishment than if one centre handled all customer services and inhouse processing.

Different groups of customers have different servicing requirements which are looked after by dedicated specialised teams. International traffic flows from Australia through Sydney to two major South-East Asian nodes in Singapore and Hong Kong which are integral elements of Citibank NA's global network.

The network has been designed to provide transparent access so that customers can connect easily and immediately with any other Citibank office. This has been accomplished by pushing the intelligence into the mainframe-communications complex, allowing customers to use completely dumb asynchronous terminals if so desired.

This transparency is accompanied by the total redundancy of network pathways, a point pushed hard by Citibank, particularly on international routes — the free standing design allowing mainframes to be considered as just another terminal.

These facilities effectively allow a customer to undertake "office banking" and communications with any Citibank office in the world without leaving his or her office.

Domestic and international network services are run in asynchronous mode, with protocol converters used to handle traffic being transmitted to synchronous processing units. Case 850 intelligent multiplexers are connected to the mainframes via protocol convertors where necessary.

Some 200 such multiplexers are installed worldwide. Customers calls when entering the network centre are handled first by an automatic answering modem connecting to an intelligent switch, (Case 850), with provisions for password entry. Messages are then switched out on to the network by the multiplexers.

The international network carries data including customer banking requirements (such as letters of credit), and electronic mail/bulletin board information for bank officers. The electronic mail is hosted by DEC machines in Singapore which handle both international destinations and traffic between Citibank offices in Australia.

Now that Telecom and OTC's Minerva have got together to offer the one mechanism to send electronic mail to either domestic or international destinations, rather than having separate services, Kendall will be investigating whether this new service could supplement the company's own network.

> *'Australia's isolation is advantageous because if a product works in a network linking Sydney with Hong Kong, it will work anywhere'*

Transparent

Kendall said both the bank and its customer use the one communications software package designed by the regional office in Hong Kong. This "standardisation" helps customers administratively and also ensures that messages will be accepted by any Citibank mainframe, anywhere.

On the Sydney-Melbourne route, Citibank takes advantage of Telecom's 48K-bits/sec service with 9600bit/sec links connecting the other capital cities in a star configuration.

On the 48K-bit/sec link, Scitec BSP time-division multiplexers front end the Case multiplexers to handle Cosmos, a large application package for Citibank's own business processing on the IBM machines. Again demonstrating international co-operation within the bank, Cosmos was first developed in Brussels in the early 1970s.

For data encryption in the network "We encrypt everything that moves." Racal-Milgo Datacryptor IIs are installed for domestic traffic and the Datacryptor III model for international links. While these encryption devices do not cover calls from customers, a proprietary authentication device within customer offices makes active or passive tapping virtually impossible.

Traditionally, PABXs have been the responsibility of the retail bank. Present installations comprise Rolm, Philips, Plessey and NEC units.

The diversity of this equipment illustrates that while co-operation is very strong on the agenda between international units of Citibank, the Australian company does not automatically have to choose equipment recommended by a regional office. It is, however, privy to research undertaken by offices.

Further, Citibank itself does not bear allegiance to any particular supplier. It chooses the equipment it regard as being most appropriate for the application at the time.

As to PABXs handling data, Kendall said that this application might possibly be pursued but he personally did not see many advantages at the present stage of development.

The bank has its own telex network worldwide. With the coming digitisation of voice and facsimile transmission, Kendall said the world was becoming smaller and the drop in bandwidth prices was lowering the cost of communications.

The bank's international co-operation and information flow ("Money and information are interchangeable") also applies within the Australian organisation. Kendall said he had ready access to the upper decision makers, and the company also ensures policies filter down throughout the organisation. There electronic mail has a distinct advantage.

Kendall acknowledges that his particular group is hungry for information about technology advances, even those which may appear now to be "blue sky". Besides reading extensively, he welcomes rather than discourages, visits by salesmen, because they enhance his knowledge both of the developments in the pipelines and new deliverable products.

After such conversations, Kendall said, he is in a far better position to determine possible improvements in service.

In testing the appropriateness of products for Citibank, Kendall finds Australia's isolation to be advantageous, because if a product works in a network linking Sydney with Hong Kong, "it would work anywhere".

The bank is now testing Concord V.32 modems from Datacraft. If suitable, they will be given added memory to handle satellite delays and tested between Sydney, Hong Kong and New York. If all these tests are satisfactory for the bank's own purposes, the modem could provide a cheap and viable option if leased lines connecting a country to the world network go down.

Two illustrations, at opposite ends of the network spectrum, illustrate Citicorp's keenness in examining new technologies to determine whether they have cost advantages or can improve existing facilities or introduce new services for customers.

Due to Kendall reading a small article in a UK magazine, the bank is now trialling an office network based on use of conventional in situ electrical cabling. Kendall said the intentions were to find out whether it works under Australian conditions, and if so, the penalties and benefits. Working at 9600bit/sec, the application would be suitable for general office use, but not for file transfers.

All told, the bank has about 200 personal computers in its Australian headquarters alone. At the other end of the communications scale, Citibank has been involved in trials with OTC's Satnet III, a satellite service based on a very small earth dish.

Intended only for low-volume traffic users, Kendall described the service as "excellent" for what it was supposed to do. Citibank may be interested in placing the dishes in countries where it has small external traffic requirements.

As part of its push into information, Citibank NA, has acquired Quotron, a financial news service operating in the US. This illustrates again that for Citibank, information is money.

The 'secure bunker' formula

By Noel Bennett

WHILE the saying "you can't teach an old dog new tricks" may imply a degree of stodginess and inflexibility, on the positive side it can also suggest that past experiences can be a valuable guide to present practices.

Decentralisation of main computing resources between capital cities was the bandwagon of much of the 1970s, bolstered by arguments of ensured continued operation of some parts of the network in the event of either a disruption to major communication lines or catastrophic systems failure at one of the sites.

On paper, the argument was both sensible and rational. But on the way to implementation new techniques and products were becoming available which reduced markedly the likelihood of a total failure in the main site.

Further, Telecom was also progressing towards "fail-safe" services and Aussat was soon to appear on the drawingboards, enabling a skeletal service to be maintained even if the worst happened.

But costs also clouded the then preceived advantages of split systems. As John Pointing, production manager, Group Information Services, Wormald International, says: "I have seen how costs balloon out by about double as a rule of thumb when decentralising and locating computers in remote sites. Distributing computing by giving VDU's, and printers to users is the way to go."

These costs take in telecommunications, where "everything becomes an STD charge," the labor of machine operators together with additional rent, power and air conditioning costs and many other considerations.

Besides direct financial costs, the organisational load is also very demanding, difficult and time-consuming.

> *'A skeletal service even if the worst happened'*

This is not to say that the Wormald Group, operating in many places and offering a wide range of equipment and services, does not have machines away from its Crows Nest, Sydney, group headquarters.

What it does mean is that machines in the field are supported totally from Crows Nest where all the company's DP personnel are located.

As Pointing says, while a large Prime 9955 is being installed in Melbourne to cater for the processing loads originating in the Southern and Western regions, it will be supported online from Crows Nest. Similarly, a Prime 2655 now in Crows Nest may be moved to the group's new Dee Why premises.

As Pointing is quick to add, the absence of DP staff at these sites on a continuous basis does not mean that those dependent on the machines are left in limbo — they can take their concerns and suggestions to business administration personnel who then liaise with head office.

The company is a Prime "shop" with the present installation comprising two 9955s, one 750, two 2655s and a 9655. A Burroughs B1800 was phased out on September 30 last. These computers support more than 170 VDUs and also 29 printers.

The Telecom lines in Wormald's network include Datel for intra-urban traffic and 9600 bits/sec DDS on the major trunk routes to Brisbane. Melbourne (also hosting Hobart) and Adelaide (linking into Perth).

Pointing says the Datel lines are gradually being replaced by DDS to take advantage of lower prices and quick re-routing around any line problem. The line traffic is handled by Case DCX multiplexers, from the 850 model down to the 812.

Pointing noted that Telecom's ADS (Analogue Data Services) offered very high speeds. But while Wormald could choose the most appropriate modems from suppliers other than Telecom, they also had to be repaired by that supplier and not by Telecom — a possible handicap.

He is concerned by the fact that ADS does not receive the attention it deserves from Telecom, but he gives Telecom full marks in the technical area, saying the incidence of line problems has declined dramatically, accompanied by a "remarkable" improvement in time taken for their repair.

Telecom is making a "valiant" effort to upgrade all areas of its telecommunications services, Pointing says. On other operational aspects, Wormald has engaged a consultant to advise and assist with the company's data security and systems redundancy planning.

To cover international operations, Wormald will be using Geisco's Quick Com electronic mail service, coupled with filing and off-line preparation facilities, to transmit financial data and company reports.

On internal office personal computer networking, Pointing says that while systems were looked at last year and indeed one was chosen, it has not been implemented.

On reflection it was considered that there was no over-riding and impelling reason why such a network should be installed — the company has not suffered by not having such a system and at the worst, diskettes could be exchanged. It was also considered that such systems were presently characterised by too many constraints.

A similar attitude prevails with telex. With some 70 to 80 per cent of this traffic moving within Australia, overlaying this traffic with an electronic mail system had some appeal, but examination showed that it could not be justified at present.

Pointing says that while he spends more time now on management, he still keeps abreast of developments such as ISDN and satellites, to ensure that the group can investigate and, if appropriate, take advantage of them.

"We believe in the fully protected and secure bunker approach. I still carry pliers and screwdrivers," he says.

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